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BACKUP

ORGANIZING THE I.S. DEPARTMENT FOR END-USER COMPUTING

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ORGANIZING THE I.S. DEPARTMENT FOR END-USER COMPUTING

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I INTRODUCTION

- This report is one of six reports on Information System Strategies being published by INPUT. These strategy reports are a part of INPUT's Corporate Systems Planning Program.

A. REASONS FOR PRESENTING THIS REPORT

- Accountants, production control supervisors, underwriters, inventory control clerks, middle management, and all the other business professionals ~~that are~~ categorized as end users are rapidly realizing the cerebral power of the information processing tools being marketed today. ~~The~~ End users are seeking these tools with or without the assistance of the Information System (IS) Organizations.

- As the agent of change, the IS organization should be the first to recognize~~d~~ the potential benefits of the trend toward more direct end-user involvement in developing computer-based solutions to business information needs. In order to facilitate this trend, IS must make a critical review of its organizational structure. In most instances IS will be required to re~~cognizing~~organize in order to take full advantage of the emerging technologies designed to bring more computer power to ~~the~~ end-user workstations.

- IS management, and in most cases, Senior Management wants to know:
  - How are others organizi~~i~~ng to meet the challenge of end-user computing?
  - How are others addressing the issues related to hardware and software compatibility?
  - What is the most effective way to maintain control over computing and still provide the best possible service?
  - What are the risks of allowing too much flexibility to the end user in selecting computer solutions?
  - What are some of the administrative issues to be addressed in regard~~s~~ to end-user computing?

B. SCOPE AND USE

1. SCOPE

- This report will analyze several end-user computing strategies being employed by large firms from a variety of industries. It will not only examine the structure of each IS organization~~,~~ but ~~it will~~ also identify the policies and procedures being used to manage the latest technologi~~es~~CAL innovations.
- This report will discuss the organizational impact of the following aspects of end-user computing:
  - Standalone PCs.

- Information Center.
- Microcomputer Center.
- OFFICE SYSTEMS. ~~Electronic Office.~~
- Internal Timesharing.
- Distribut~~ive~~ed Data Processing.

2. USE

o This report provides:

- Organizational mode~~s~~l ~~which~~ that can serve as guidelines for IS strategic planning.
- A base for comparing plans and actions of IS to those of other IS organizations.
- Arguments in favor of supporting the end-user computer revolution.

o This report should be of interest to:

- Executive management.
- Senior IS management.
- Managers of end-user computing.
- Corporate systems development management.
- IS coordinat~~ions~~ors in using departments.

- Internal auditors.

C. METHODOLOGY

- A sample of INPUT's subscription clients were first polled to identify the major issues ~~which~~ that they ~~believed to be the most important to be~~ wanted covered by this report.

- Based on the recommendations from the client poll, a questionnaire was designed to cover all of the pertinent topics.

- In-depth interviews were conducted with IS executives~~,~~ and IS management involved in end-user computing support and/or IS systems development from very large, leading-edge firms in a variety of industries, including insurance, banking, manufacturing, retail, and utilities.

D. REPORT ORGANIZATION

- Chapter II is ~~the~~ an executive summary in presentation format ~~and~~ with supplementary discussion.

- Chapter III sets the stage for the subject of end-user computing by tracing the evolution of this phenomenon from the beginning of computers in business.

- Chapter IV discusses some of the reasons why ~~the~~ end users haven't automatically turned to IS for assistance and support.

- Chapter V identifies actions ~~which~~ that can be taken to improve the IS image and motivate users to seek consultation and direction from IS on matters related to end-user computing.

- Chapter VI provides an analysis of the risks ~~involved~~ both to IS and to the organization if ~~the~~ users are allowed to obtain and use computer hardware and software at their d~~e~~iscretion without the essential controls from IS.

- Chapter VII identifies the steps to be taken by IS to facilitate ~~the~~ end users' ~~in their~~ search for improved methods of obtaining decision-making information. The following topics are discussed:

  - IS Organizational Alternatives.

  - Systems Design Alternatives.

  - End-User Education.

  - Rules and Regulations.

  - Internal End-User Computing Users' Groups.

- Chapter VIII contains a summary of the conclusions drawn from the research and outlines specific recommendations.

- The appendix contains a sample questionnaire used in the fact-gathering interview process.

E. RELATED INPUT REPORTS

- Interested readers are referred to the following INPUT reports:

- Executive Workstation Acceptance: Problems and Outlook. ~~(April 1984).~~ ✓

  - This report identifies executive computing requirements, analyzes products, and recommends executive computing support strategies.

- Supporting Personal Computer Software. ~~(August 1983).~~ ✓

  - This report describes the planning and organizational issues of personal computer software support. It also provides a guide to maximizing the benefits of personal computer software.

- Organizing the Information Center. ~~(July 1983).~~ ✓

  - A key issue is the extent to which the information center is complementary to, or an ~~alternate~~ alternative for, the personal computer.

- The Opportunities of ~~End-User Experiences with~~ Fourth-Generation Languages. ~~(August 1983).~~ ✓

  - Can fourth-generation languages help make the centralized mainframe competitive with the PC?

  - What role will current or future fourth-generation languages have on PCs?

- Personal Computers versus Word Processors: Resolving the Selection Dilemma. ~~(June 1983).~~ ✓

  - This report compares and contrasts PC and ~~WP~~ word processor roles in the office environment for today and the future.

- END-USER MICRO-MAINFRAME NEEDS ~~NOV 1984~~
  - This report concentrates on the experiences of organizations that use personal-computer-to-mainframe systems. It also identifies systems requirements and projects future effects.
- Micro-~~to~~-Mainframe Tele Communications ~~October 1984.~~ ✓
  - Analyzes, in detail, personal computer communications modes, their advantages and limitations, and how these communications are likely to change in ~~the~~ next two to three years.
- Training Techniques for End Users ~~June 1984.~~ ✓
  - This report covers initial and on-going training and support for end users of personal computers, personal workstations, word processing, office systems, and information computing provided by IS.
- Future Skills Requirements for Software Development ~~October 1984.~~ ✓
  - This report examines many of the latest productivity schemes to determine the impact ~~the~~ that new methods are having on the skills mix of IS.

II

II EXECUTIVE SUMMARY

- This executive summary is designed in a presentation format in order to:
  - Help the busy reader~~s~~ quickly review key research findings.
  - Provide an executive presentation and script that facilitates group communications.
- The key points of the entire report are summarized in Exhibits II-1 through II-6 ~~7~~. On the left-hand page facing each exhibit is a script explaining the exhibit's contents.

A. THE CHANGING ROLE OF I.S.: FROM SYSTEMS DEVELOPER TO CONSULTANT

- During the past 25 years the glacier of end-user computing has been moving at a slow, but steady pace, towards the sea of computer technology.

- ~~The~~ End-users have never let up on their demands for readily available information on which they ~~could~~ can base decisions. IBM, and other pace setting information services firms have continued to respond to the pleas of ~~the~~ end users. The objective has been, and still is, to put the power and capabilities of computer technology directly in the hands of the people being serviced.

- Much of the movement towards end-user computing has been so subtle that IS has not been aware of the significance. Many IS managers la~~x~~g behind the innovators ~~in~~ because of a fear of losing control of an empire that took so long to build.

- The pulse of end-user computing has quickened with the advent of microcomputers and easy-to-use software. A~~t~~ each stage of end-user computing, IS and ~~the~~ users have increased their collaboration on systems development. From RPG in the 50s; ~~and~~ to teleprocessing in the 60s and 70s; to the electronic office, personal computing, and prototyping ~~of~~ in the 80s, the role of ~~the~~ IS has changed from strictly processing data to information service consul~~tants~~ting.

B. ORGANIZING FOR END-USER COMPUTING SHOULD INCLUDE AN INFORMATION RESOURCE CENTER

o ~~The~~ astute ~~of~~ IS managers have adapted their organizations to the major technological phenomena over the years. They have been aware of the ramifications of this phenomena and have reorganized to realize the greatest potential benefit from each significant innovation.

o Some of the past milestones in the computer technology industry that have caused IS managers to consider changes in their organizations include:

~~Squeeze so that pg 4 will fit at the bottom of this page.~~

- The deluge of systems software in the 60s,
- Telecommunications and terminal devices,
- Timesharing,
- Productivity tools,
- Distributed data processing,
- Database management systems, and
- Fourth-generation languages.

o Most of the above milestones are directly related to the support of end-user computing. Now ~~the~~ IS managers are adapting to the micro phenomenon and the information center concept. An information resource center, which provides consulting, training, and technical assistance for the application of end-user computing tools will ~~namely be found~~ report~~ing~~ directly to the top IS executives.

add p.4 text

- The information resource center houses supported microcomputer equipment, terminals to the corporate mainframe, and pilot devices for office systems. The information resource center is responsible for supporting all end-user computing endeavors.

C. FUTURE I.S. ORGANIZATIONS

- ~~Training~~ Tracing the successive stages in the development and progress of end-user computing, it is not too difficult to predict what is in store for future IS organizations.

- As new generations of software literally eliminate the need for technical expertise, ~~skills~~, computer applications will be developed more and more by the business professional. This has already started with such user friendly packages as IFPS from Execucom and FOCUS from Information Builders. Major corporate systems will be replaced by proprietary software packages.

- INPUT foresees the time when systems development and traditional data processing will be distributed throughout on organization. This cost/performance of microprocessors is breathing new life into the impact of distributed data processing. Corporate IS will maintain the responsibility for technical planning and consultation, policies, procedures, standards, and guidelines. Corporate IS will also be responsible for integrated accounting-type applications and general computer training.

- This migration of systems development to ~~the~~ functional business units has already begun in many corporations. The first step is to move the programmers and analysts from the control of IS to the control of each of the major operational divisions.

D. LIP SERVICE IS A DANGEROUS APPROACH

- No one likes to be thought of as an ostrich -- that is, ~~with its alleged habit of buying its~~ ~~as an animal that buries its~~ burying one's head in the sand -- to escape from disagreeable situations. Most IS managers want to be thought of as being on the leading edge of technology. Many acquire the latest mainframe equipment to achieve this image.

- Claiming to support end-user computing with a liberal policy (-- that is, giving lip service to end-user computing --) that allows carte blanche ~~re~~acquisitions of microcomputer equipment and software is playing the ostrich. However, ~~T~~there is deep-seated hope that this craze will soon pass and computer matters will return to IS.

- Without leadership from IS, computer resources would continue to sprout up throughout the organization in a haphazard manner. This direction~~al~~less and uncontrolled growth of end-user computing would certainly result in: ~~the following:~~

  - Waste of resources through duplications and redundancies.

  - Data integrity and security problems.

  - Ill-planned and ill-programmed applications without standards or guidelines.

  - The ~~I~~inability to integrate computer resources (micro-to-mainframe links and local area networks).

  - Vendors promising results that products are incapable of delivering.

  - Strained relations between users and IS, and between IS and senior management.

E. VIEWING END USERS AS CLIENTS IS IMPORTANT

o Providing leadership for the orderly growth of end-user computing requires rules and regulations. The problem with rules and regulations is that by nature individuals do not like to be ruled or regulated. ~~The~~ end users have become frustrated with the bureaucratic red tape of IS and will avoid it whenever possible.

o The benefits of complying to standards must be sold. IS must ~~do a job of~~ market~~ing~~ the approved and supported products and services.

o ~~The~~ end users must be considered as clients of the end-user support group within IS. Some companies are referring to this group as the client support group. The client support staff has ~~have~~ job titles such as consultant, or representative.

o Marketing products and services is accomplished much like any outside supplier would ~~do it~~. The following are some suggested approaches to marketing that the client support staff can follow:

- Scheduled demonstrations.
- Tours of the information resource center.
- Introductory education.
- Newsletters and bulletins.
- Discounts on approved products.

F. SYSTEMS ARCHITECTURE CONSIDERATIONS SHOULD INCLUDE ALL INFORMATION RESOURCE TOOLS

- Care must be taken not to sever the conventional systems development staff completely from the information resource center. The systems analysts must understand the capabilities of ~~the~~ end-user computing tools to ascertain the most appropriate solution to a business problem.

- In turn, the client support staff should be aware of the mainframe systems and the associated data to best assist end users in building decision support systems.

- During the next ~~ten~~ 10 years, INPUT predicts that most organizations will ~~be~~ ~~waving~~ go through six stages of architectual systems design ~~approaches~~. The first stage is the conventional approach without regard~~s~~ to end-user computing requirements. Stages two and three are where most firms are today; colon a ce~~rtain~~nter or centers ~~where~~ in which end users can develop information applications for their individual management needs, and a separate systems development staff handl~~ing~~e traditional transaction-driven systems. Stage four starts tying together all end-user computing requirements with local area networks and micro-to-mainframe links. At stage five, corporate systems will integrate end-user personal computing requirements into the design specifications, and the responsibility for all information systems development will be under the direction of one leader. At stage six, some organizations will find it advantageous to move the systems development staff to the operational divisions.

- ~~If at all practical,~~ INPUT recommends, ~~as a start,~~ rotating systems development personnel for awhile through the information resource center for familiarization, if it is at all practical.

G. THE ~~PC~~ Personal Computer USERS' GROUP CAN PROMOTE UNIFORMITY AND COMPATIBILITY

- Just as associations such as GUIDE and SHARE have been serving IBM users for more than ~~twenty~~ 20 years, ~~the~~ PC users' groups have started to emerge.

- The users' groups~~s~~ found in industry are normally managed by the end users with IS in an advisory capacity. IS can be included in the program, buT the end users develop the agenda.

- Special interest groups are formed and recommendations are presented to the end-user computing steering committee (comp~~ris~~osed of senior management members and IS representatives).

- The conclusions of these meetings of the PC users' groups are published in a special companywide newsletter or a section of the established company newspaper.

- IS should initiate this activity with a kickoff meeting at which IS could explain the purpose of ~~the~~ group) and some possible bylaws.

H. I.S. MUST PROVIDE THE LEADERSHIP AND TALENT

- The prospects for information systems by the year 2001 are very exciting. The ability of ~~the~~ technology and the continued demands of the work force for information tools, are leading the information services industry towards a goal of total integration.

- INPUT envisions the white-collar workers of 2001, with their own intelligent work stations capable of handling all ~~of~~ the information and communication requirements for their particular job functions. Systems design and development will be dynamic and flexible to suit each individual.

- The view of this information and communication environment ~~and~~ from the worker's or end-user's standpoint will be simple and straightforward. Behind this scene, however, will be a very complex central coordinating function with the responsibility for maintaining a repository of corporate data on data base machines that interface with each worker. Technical planning and coordination will be of utmost importance.

- The composition of IS has been changing over the years to include technicians with data management and systems communications skills. The challenge for IS is to provide the leadership and technical talent to drive information services to the ultimate goal of individual information and communication workstations.

III

III END USERS - PAST, PRESENT, AND FUTURE

A. THE NEED GOES ON

- Vendors of computer technology and related services have historically directed their research and development toward~~s~~ the demands of the ultimate users of information. Digital computers were introduced to the business world as data processors that could provide timely and accurate information for the functional units of an organization.

- ~~As depicted in Exhibit III-1,~~ The evolution of computer technology has been driven by the need for the precise information required to direct and manage each operational function of an organization. Every entity with an objective requires information on which to base decisions. The more succinct the information is ~~almost~~ about the facts involved, the better chance the decision maker has in selecting the best alternative. The need to analyze data and communicate decisions has not changed. Only the tools and methodologies continue to change.

~~III-1~~

- Soon after data were collected and stored to satisfy the record keeping for accounting purposes, management in every industry realized the potential benefits of accessing and analyzing that data. The data held the truth about progress versus plans. Management could build a model of the enterprise from the data to identify weaknesses and strengths, and make adjustments accordingly.

- The desire to look at and study the factors ~~which~~ that support or impede an entity in its pursuit of success has always been there. IS management should understnd this need and give it utmost consideration when evaluating innovations in computer technology.

- One of the main reasons for this report is to make IS management aware of the motivating force behind ~~the~~ end-users' growing involvement in the development of information systems. IS must lead the way in the use of information resources. In the past, IS has accused ~~the~~ users of being resistent to change, but today many IS professionals are resiting the changes in computing brought about by the advent of ~~the~~ microcomputers.

- ~~In~~ Exhibit III-1 ~~are~~ depicts the major milestones in delivering computer capabilities to the workers or end users. In the 1950s tabulating equipment gave way to digital computers, but the output to the end user was still reams of ~~historic~~ historical reports. By the late 50s RPG ~~cut down~~ reduced the time it took to produce a new report and by the mid-60s end users could make simple queries. It wasn't until the 80s before the concept of the information center took hold. By the end of the 1980s most workers will have computer tools available to analyze, model, create reports and graphs, and communicate their finding to ~~their~~ fellow workers electronically.

III-1

- To put end-user computing into perspective the remainders of this chapter will trace in detail the history of user-developed systems from the inception of digital computers in business.

B. IN THE BEGINNING

I. STAGE ONE--DATA MANIPULATION AND RPG

- o In the mid-50s When stored program computers were introduced to tackle the data processing job, large insurance companies saw computers as a way to reduce the enormous clerical staff it took to prepare policies and process claims. Large manufacturing firms used the computer to calculate parts requirements, to maintain inventories, and to release shop orders and purchase orders. In general, computer resources were directed at cutting costs and speeding up production.

- o Permanent storage came in two forms, magnetic tape or punched cards. Some of the master files were comprised of dozens of magnetic tapes or trays of cards. To select specific data from these files meant reading each record into the central processing unit in a sequential manner. Department managers were asked for status and progress reports which they provided by requesting a variety of report formats and sequences from the data processing master files.

- o As illustrated by Exhibit III-2, ~~the~~ end users would produce hand-prepared management reports for decision making by manually manipulating the data extracted from ~~off of the~~ data processing master files. This process would take days and sometimes weeks to accomplish. The accuracy of the information left a lot to be desired because of the time involved and the manual intervention.

III-2

- o The demand for different selections, formats and sequences of the operational files kept growing and Data Processing soon was faced with a backlog of requests for new reports. Many reports produced were never looked at, but were shelved in anticipation of a particular question from executive management.

- o IBM recognized the need for a way to break the log jam of requests for management reports so it introduced RPG (report program generator) in the late 1950s. As shown in the Exhibit ~~III-2~~ this new tool didn't change things too drastically. Even through some of the end users learned how to code and RPG form, most of the RPG programming was done by Data Processing. This, however, was the introduction of end-user computing. Perhaps more end users

ok

would have learned how to use RPG if Data Processing hadn't been reluctant to relinquish control over programming.

2. STAGE TWO--TERMINALS

- By the end of the 1950s the major computer manufacturers were offering direct access devices to overcome the time problems created by the necessity of passing an entire tape file to access particular records. The direct access device revolutionized the data processing industry.

- During the 1960s teleprocessing was introduced ~~and~~ stet typewriter and cathode ray tube (CRT) were connected to the mainframe through cables or telephone lines. Pioneers in bringing ~~the~~ computer capabilities directly to the end user included American Airlines with the Saber on-line reservation system, and IBM with its Advanced Administrative System.

- These early systems, as shown in Exhibit III-3, allowed end users to enter business transactions directly to the computer from a remote location and to make fixed-format inquires about the status of a business process. III-3

- Also, during that same period IBM introduced major systems software directed at end-user computing. For those end users who wanted to develop their own programs, at their own workstations and interact with the computer, IBM offered the Timesharing Option (TSO). Most of these users were engineers and scientists.

C. MODERN TIMES

1. STAGE THREE--THE INFORMATION CENTER

- For a dozen years or so after terminals were introduced, organizations within every industry were busy building on-line production systems. Management enjoyed the ability to access the master files for the status of the major operational functions, but the fixed-format CRT screens didn't provide the flexibility needed for decision making. There was still the manual manipulation of data from several different sources required to create a model of any segment of the business. The backlog of requests for special reports continued to grow up to 1980.

- Again, IBM reacted to the demands of the ultimate user of information and introduced the concept of the information center. This stage of user-developed systems has had a major impact on the IS organization. A totally new department had to be created to support this new activity.

- Exhibit III-4 depicts the information center as a special room equipped with terminal devises where end users can develop their own information systems utilizing extracts from the corporate data bases. III-4

- Since the inception of the information center concept in ~~1979~~ the mid-70s many easy-to-use software packages have been marketed to support end-user computing. With the assistance from the IS staff, end users are learning how to make data base queries and build models for analysis. End users can now generate reports and graphs on the computer in hours, ~~which~~ reports that used to take days or weeks to produce manually.

2. STAGE FOUR - STANDALONE PERSONAL COMPUTERS

- Overlapping stage three was the introduction of the microcomputer to ~~the~~ business users. In many organizations the microcomputer found its way to the end user before an information center was established. Apple computers and VISICALC were available in 1979, which is the year the first information center was operational. Some companies are just now setting up information centers and/or installing personal computers.

- Microcomputer equipment and software vendors answered ~~the~~ end users' call ~~from the end users~~ for inexpensive, easy-to-use computer tools. If they could get away with it, ~~the~~ vendors negotiated directly with ~~the~~ end users, bypassing the corporate IS staff.

- ~~The~~ end users received this new-found computer freedom with open arms and, as illustrated in Exhibit III-5, microcomputers sprung up in departments all over the nation in almost every industry. III-5

- Today, the individual personal computer user has nearly all ~~of~~ the options offered from the information center, with the additional flexibility of ownership. The big problem has been the inability to access the corporate data bases, which has entailed the rekeying of data. Vendors have been busy trying to overcome this hurdle.

- This stage in the history of user-developed systems caught many IS managers "napping" ~~and~~ when they "awoke" they disc~~ussed~~overed a chaos caused by incompatibilities and inadequate controls. Chapter VII will discuss positive steps to ~~take to~~ correct this situation. ✓

D. THE FUTURE

I. STAGE FIVE--MICRO~~-TO-~~MAINFRAME LINKS

- In mid-1984 INPUT published two reports on the subject of the future of micro-mainframe applications. One is entitled End-User Micro-Mainframe ~~[illegible] 1984~~ Needs, and the companion report is Micro-Mainframe: ~~Communications Issues~~ Telecommunications ~~of (October 1984)~~. INPUT believes that future applications development will include more processing and/or data being shared by both the mainframe and the micro. INPUT has termed this concept "shared functionality," which is illustrated by Exhibit III-6. III-6

o Some companies have already started linking mainframes and microcomputers by downloading data to the PCs through proprietary software vendor~~'s~~ linkage packages. Others have installed IBM XT/370s with access to mainframe software through VM/CMS.

o Most respondents to the survey questionnaire for this study believe that integrating micros into corporate systems development is the wave of the future. This means that IS will need to change its outlook and orientation to include ~~the~~ users' local computing requirements in future systems requirements definitions for major new systems development. The changing IS orientation is the subject of Chapter V.

2. STAGE SIX--END-USER-DEVELOPED SYSTEMS

o Moving the applications development staff (programmers and analysts) from the corporate IS function to the various end-user departments has started to happen (especially in the discrete manufacturing industry). In these instances corporate IS maintains control of all mainframe hardware. IS also ~~and~~ sets polic~~y~~ies and issues standards related to computer resources.

o As depicted in Exhibit III-7, INPUT can see the likelihood of shared micro- or minicomputers at the departmental level with ~~a~~ two-way data flow linkage to the corporate central mainframe. Each department will have its own systems development staff that will be responsible for building information systems that will satisfy both the specific needs of the department and the integrated needs of the corporation.

III-7

o Programming will be kept at a minimum by the use of application packages, program generators, and general software for such processing as spreadsheets, word processing, and graphics.

- Looking back over the stages of end-user involvement in computing, it is interesting to note that most of the innovations and technological advances have been caused by ~~the~~ Stet end-users' frustration over the inability of IS to respond to the information needs of the individual worker. Chapter IV will discuss some of the causes for the users' negative perception of IS. ✓

IV

IV INFORMATION SYSTEMS' POOR TRACK RECORD

o INPUT is not implying by the subject of this chapter that IS is at fault for the woes of the information services industry. INPUT believes, however, that it is important to review the circumstances that have forced ~~the~~ end users to search for alternative solutions to their information systems problems.

A. MAIN LINE SYSTEMS MENTALITY

o The data processing function has always been a major drain on the expense budget of an organization. For this reason executive management has been scrutinizing project proposals involving the use of computer technology. Tangible benefits, such as a reduction in personnel costs, or an improvement in customer services, have been easier to sell than intangible benefits, such as internal performance measurement systems.

o ~~For~~ Top priority has gone to ~~those~~ information services projects that appear to have a direct impact on the profit-and-loss statement of the firm. ~~, which is illustrated by Exhibit IV-1,~~ Projects that improve the processing of operational production transactions are typically at the top of the list. This emphasis has caused the systems developers to concentrate on how to improve the flow of data through the organization. ~~and~~ In doing so, developers ~~they~~ have neglected the information needs of the individual department managers. Exhibit IV-1 shows the major operational functions within a typical manufacturing organization, as well as the list of IS projects by priority.

IV-1

IS has been directed to either reduce the operating costs of these functions or ~~to~~ speed up the process in order to beat the competition in deliver~~y~~ing the product.

1. BUREAUCRATIC

- Building a computer-based business system has become a very complex and involved undertaking; somewhat analogous to the construction of a skyscraper. One has to deal with ~~There is~~ the requirements, the proposed a design architecture, the development methodology, standards, signoffs, cost control, and so on ~~and on.~~ IV-2

  Space

  As depicted in Exhibit IV-2, Information Systems has stymied the end users with bureaucracy. Many of the bureaucratic steps have been established to protect IS from being singled out as the cause of delays, misunderstandings, and problems. The whole process of systems development has become extremely formalized with proprietary development methodology systems such as SDM/70.

2. REACTIVE

- Information Systems has earned the reputation of being reactive. It has become so bogged down with procedures, approvals, cost/benefit justifications, steering committees, and the like, that it requires prodding to get it to pay attention to the computing needs of individual end users. IS tends to react only to problems or edicts from management. From the beginning of the automation period, end users have sought ways of circumventing the IS organization. Outside service bureaus, timesharing services, contractors, and personal computers are avenues that ~~the~~ end users have taken. ~~to which~~ IS has had to react to the same forces because senior management has become concerned with the rising cost of these computing resources.

- Instead of being innovative, many IS organizations respond only to formal requests for services. They let the end users provide the justification, and they let a committees set the priorities. This is all well and good, but if IS is

not also continuing to identify areas of ~~the~~ business that can benefit from computer technology, then it is not fulfilling its total mission. The worst that can happen is for IS to allow computer technology to enter through the "back door" as ~~has~~ personal computers have in many organizations. The risks of doing so are outlined in Chapter VI. ✓

B. END-USERS' NEGATIVE PERCEPTION

1. HOPELESSNESS--THE PRIORITY SETTING

- The terms "invisable backlog" or "hidden backlog" are used to describe the work that departments within an organization believe should be accomplished by the help of computer technology, but requests for this service ~~isn't~~ aren't submitted to IS because ~~the~~ users perceive that IS would never be given the time to satisfy them. ~~The~~ users feel helpless and hopeless. Exhibit IV-3 represents the impression users have of the IS backlog of requests. ✓ IV-3

- Even if ~~there are~~ committees are formed of management personnel from every major division or department to set priorities and review requests for IS services, the user with the rejected request will have a tendency to blame IS. This adds fuel to the negative perception flame.

2. MISSED TARGETS DATES

- One of the major concerns of senior management in al most every industry is the apparent inability of IS to do an adequate planning and control job. Without well-thought-out plans and sound project control measures, accurate project schedules are difficult to develop. This can only result in missed target dates. Unfortunately, regardless of the origin of the cause for late projects, IS usually is considered the culprit. If more projects are late than get done on time, then ~~the~~ end users view IS with more skepticism. This has always been a

(:) if IS

paradoxi~~cal situation~~ for IS~~;~~ incorporates every design change imposed by ~~the~~ users durig development, ~~and~~ the system is certain to be late. IF IS freezes the systems design, then ~~the~~ users claim it doesn't meet the needs.

3. SLOW TURNAROUND

- To most end users it seems to take forever to get a request for service processed through IS. Many requests involve very minor changes ~~which~~ that should require minimal effort and resources. The formal request procedures, coupled with the enormous backlog, can put a request in the queue for an ind~~i~~efinite time.

- If the requesting user receives little or no communication about the status of a request, and considerable time passes, a very negative impression is formed. The user will be reluctant to turn to IS for assistance in the future.

C. VENDOR-DRIVEN SOLUTIONS

1. SELLING TO THE END USER~~S~~

- The poor service from IS made the end user~~s~~ easy prey for ~~the~~ lurking vendors of microcomputer hardware and software.

- ~~The~~ Vendors grabbed the opportunity to sell the products and services directly to the inexperienced, unsophisticated end user. In too many companies IS ignored this situation, believing it would have no impact on traditional computing over the long haul.

- End users were receiving their computer training and education primarily from the vendors because:

- The vendors were responsive to the immediate needs of ~~the~~ end users whe~~re~~n IS had not been organized to accommodate microcomputer training.

- The microcomputer was perceived to be outside of the scope of IS's control and responsibility.

- IS had no mechanism in place to encourage ~~the~~ end users to seek IS assistance.

- End users feared that IS would impede progress by its bureaucratic nature.

2. EXPANDING THE I.S. GAP

o By ignoring the end users' desire to develop their own computer-based systems, IS actually drove the "poor relations" wedge even deeper.

o The software packages offered by ~~the~~ vendors are easy to install and use. ~~which~~ This planted a seed of doubt in ~~the~~ end users' minds regarding IS's excuses and slow turnaround: "If programming is so simple, wh~~e~~y does it take IS forever to get anything done?"

o The more ~~the~~ end users learned about computing, the more they wanted to solve their own problems and bypass the IS bureaucracy. When they started building operational, transaction-driven systems, ~~which needed to~~ requiring interface with other corporate systems, IS began to realize the power of the micro and was forced to get involved. Along with this, senior management became aware of the hidden cost of these new computer tools and demanded corporate control.

o Because end-user computing is still in its embryonic stage of development, there is little experience from which to draw conclusions about the way to

organize to assure proper balance between service and control. Chapter V and VII examine some of the approaches being employed by large companies to facilitate end-user computing.

V

V THE CHANGING I.S. ORGANIZATION

A. SHEDDING THE REACTIONARY IMAGE

I. UNDERSTANDING USERS' TOTAL NEEDS

V-1

- Strategic plans of the more aggressive and innovative IS organizations include office systems applications such as those listed on Exhibit V-1. Some of these items include linking personal computers with the central mainframe to access corporate data bases, and some require connection of company-wide workstations for such processing as mail distribution.

- ~~Be it~~ decision support, word processing, ~~or~~ departmental administration and so on all of these applications require computer technology and should be coordinated by IS. Furthermore, within IS the department responsible for corporate systems design and development must interface and collaborate with the staff responsible for end-user computing support and office automation.

- Ultimately, the total information system will be built around one type of workstation that will be able to interact with the transaction-driven systems, and at the same time support personal computing and office administration.

- The best vantage point from which to understand the information processing needs of any operational function is from within the particular business unit being serviced. This is the main reason why some organizations are decentralizing the systems development function of IS.

2. IMPROVING RESPONSIVENESS

- The early service bureaus were highly competitive in vying for a company's data processing business. The ~~mats~~ motto of the service bureau has been to do whatever it takes to satisfy a request from a customer. Many shortcuts were taken and, in some cases, prudent controls were left out, but responses to customer's requests were handled expeditiously.

- To become more customer oriented and eliminate the image of unconcern and unresponsiveness, some IS organizations have adopted the service bureau approach by establishing ~~a~~ the new position of Account Representative. These individuals report to IS, but are assigned to business units (departments or divisions) to uncover information problem areas and to assist in determining the most efficient and expeditious solutions.

3. CONSIDERING ALTERNATIVES

- Along with being reactive to ~~the~~ end-users' prodding ~~has come~~ IS is guilty of generating the "only-one-way" syndrome. Unfortunately, it is natural to jump to a conclusion that is supported by experience. A seasoned systems analyst will nearly always suggest a solution that has been tried and proven in ~~a~~ similar situations. There are instances, however, ~~where~~ in which the proven solution will take longer to implement and will require greater resources than an alternative.

queue

- ~~Now~~ Instead of automatically placing a service request in the queue and waiting for the programming staff to become available, the request may be forwarded to an end-user computing support group to investigate alternative and/or interim solutions. The alternate solution may involve microcomputers or the information center. It could involve assisting the end user in building a prototype ~~which~~ that could be used on an interim basis.

- INPUT has discovered a definite trend toward~~s~~ the acquisition of applications packages as an alternat~~e~~ive to in-house systems development. If a package can be identified that will handle the requiremen t s of a system, it will normally take less time and require ~~less~~ fewer resources to implement than would building the system from scratch.

- If ~~the~~ end users believe th a t IS has investigated every course of action for a possible solution to a service request, th e n IS has taken positive steps in improving its image. It is even better if IS takes the in i tiative and makes suggestions regarding alternate approaches.

B. EVALUATI~~ON~~ NG THE I.S. HIERARCHY

1. RESTATING THE I.S. ROLE

- Most companies have a general corporate policy covering the responsibility and authority of the information systems/data processing function. The problem with some of these policies is that they were written ~~over ten~~ more than 10 years ago and do not reflect the changes that have taken place in the information services industry.

- During the past few years it is not unusual to find that IS has assumed the responsibilities for both data and voice communications ~~which~~ This change may not be reflected in the corporate policy. Also, the entire matter of end-user computing support, including ~~electronic offices~~ office systems and information centers, should be covered in the policy.

- According to research that has been conducted during the past several years, INPUT has noticed a rise in the hierarchical status of the IS function. The IS manager is at the executive level in most organizations and reports to a senior executive who has the responsibility of the corporate administrative

functions. The IS role has expanded to include all matters of communications and office systems and procedures. This fact should be clearly publicized to all levels of management through the issuance of an updated policy and by articles in the firm's newspaper.

2. REEXAMIN~~E~~ING I.S. GOALS AND OBJECTIVES

- There are different levels of dependence on information services technology within ~~the~~ many different industries. Some companies are totally dependent on computer technology to survive in a highly competitive marketplace (financial services, retail stores, airlines, hotels, and car rental industries). Each organization should assess how it is employing information services technology to gain a competitive advantage within its industry.

- IS should be viewed as an integral part of the business, along with such functions as marketing, accounting, production, and personnel. To change the IS orientation from reactive to proactive, IS should reexamine its overall goals and objectives and make alter~~n~~ations to fit its new role.

- The IS goals and objectives should be documented and presented to the corporate policy-setting entity. This may be an information services steering committee or the chief executive officer. The point is that senior management must agree on where IS fits in the business strategy.

- Measurement of accomplishment should be conducted periodically to evaluate how well IS is doing ~~towards~~ with respect to achieving its goals ~~and objectives~~. Some companies are keeping tabs on IS's performance through the establishment of service-level agreements ~~where~~ through which IS agrees to provide an acceptable level of service. This could cover such issues as response time, problem analysis, project scheduling, request processing, and hardware/software installations.

3. ACCEPTING ORGANIZATIONAL DYNAMISM

- The IS function has been in a state of fluctuation from the first installation of a digital computer in business. IS managers have been faced with the following organizational problems ~~as~~ illustrated in Exhibit V-2: V-2

  - Should systems development be organized by the business functions being serviced?
  - Should programmers be pooled or assigned to teams?
  - Should maintenance programming be assigned to operations?
  - To whom should technical support report?
  - Should personal computer support report to the information center?
  - Should the information center staff report to the communications manager?
  - Should voice and data communications be under the same manager?
  - Where does training belong?
  - What about data base administration?
  - Who should handle timesharing services?
  - Who should be responsible for office automation?
  - What about capacity planning?
  - Who should have the responsibility for data security?

- o There are no pat answers to these ~~above~~ organizational questions. There are too many variables imposed by the type of industry, the size of the company, the stage of information services technology, and the management style. Chapter VII ~~will~~ discusses ~~some~~ various structures ~~being~~ employed to support end-user computing, but no foolproof organizational hierarchy can be recommended. ~~The point is that~~ IS management must keep an open mind on the subject of reporting relationships. It must continually assess the effectiveness of the existing span of control of each manager and be willing to change the organizational structure to best meet the goals and objectives of IS and the corporation being serviced. ✓

C. IMPROVING VENDORS' RELATIONS

1. I.S.--THE CENTRAL SOFTWARE REPOSITORY

- o Just over 50% of the companies that are well into using personal computers claim to have a formal system in place to keep track of the whereabouts of all per~~rea~~sonal computer proprietary software packages. ~~companies in~~ The other 50% ~~half~~ of companies in ~~that~~ surveyed either had plans to establish an inventory system for proprietary software or believed they should be concerned about this issue.

- o The most commo~~n~~n way to keep track of ~~the~~ software packages is ~~was~~ to have the end-user computing support staff in the information center conduct a physical inventory. IS personnel actually interviews end users to ascertain what personal computer software is installed and who is using it. ~~into~~ Other methods include~~d~~:

  - A semiannual review by internal audit.

  - That ~~All~~ all purchases for computer software and hardware ~~must~~ require IS approval.

- That IS purchases all computer software and hardware and charges using departments for ~~their~~ use. (In one case IS spreads the cost over a 24-month period, which provides an incentive for users to ~~adhere to the~~ purchas~~ing~~e ~~procedures.)~~ through IS.)

o In a few companies IS anticipates the software requirements of ~~the~~ personal computer users and evaluates various packages for ~~a~~ specific functions. Once IS has made a choice among the vendors, that package becomes standard and is the only one on which IS will guarantee support.

2. THE PERSONAL COMPUTER CENTER

o A personal computer center is ~~a~~ locat~~ion~~ed within the IS organization ~~which~~ ~~that~~ and houses the microcomputer hardware and software that IS is committed to support. End users can use the personal computer center to:

- Perform computer processing for their individual needs.
- Be trained on hardware and/or software by the IS staff.
- Evaluate the available computing resources for a subsequent acquisition.

o Nearly 65% of the companies interviewed said that they have a personal computer center established. Most of the personal computer centers are the responsibility of the Information Centers. One company reported that each of its divisions has a personal computer center that the employees may use.

o The personal computer center provides IS with the tools to help ~~the~~ end users investigate alternatives to their information services concerns.

o The personal computer center also places IS in a more supportive role that encourages ~~the~~ end users to look to IS for assistance. This concept has forced ~~the~~ microcomputer vendors to sell to IS instead of directly to the end users.

V-3

3. PUTTING I.S. BACK IN THE LOOP

- Exhibit V-3 indicates the sequence of steps employed by those companies that have established procedures that ~~the~~ end users must follow to acquire any unique standalone equipment and/or software.

- Initially the user will request the assistance of an IS consultant to review the computing needs identified by the user. In most companies ~~, which~~ that employ these procedures, the consultant is part of the personal computer center staff.

- Once the requirements have been determined, the IS consultant will first review the current inventory of microcomputer resources to see if something already being used can handle the job. If not, then the consultant will identify the most likely vendors ~~that would~~ to supply the solution.

- The IS consultant will screen the vendors by reviewing their financial performance ~~over~~ during the past five years and ~~by~~ contacting some of the vendors' customers for reference checks. INPUT's Company Analysis and Monitoring Program (CAMP) is an excellent reference for checking the profiles of independent hardware and software vendors. Not only does CAMP provide detailed financial histor~~y~~ies, but it also examines products, markets, and future plans of hundreds of vendors. It is important to conduct a vendor viability analysis, and CAMP can assist greatly in the process.

- The selected vendors are invited to demonstrate their products to the users and the IS consultants. If possible, the selected product is installed ~~in~~ at the PC center on a trial basis. ~~The~~ users can build ~~a~~ prototypes of their systems at the PC center.

- When ~~the~~ users finally agree on a particular product, the Internal Auditing Department reviews the controls of any proprietary software packages to assure adequate systems controls.

- Contracts covering products and services of outside vendors should be negotiated by the IS consultants and, if complex, should also be reviewed by the company's legal counsel.

D. MARKETING APPROACH

- To gain control of the activities associated with end-user computing, IS must promote products and services that are end-user directed, instead of preventing their use. Exhibit V-4 shows several approaches being used to market IS products and services to ~~the~~ end users.

V-4

1. SELLING NEW SERVICES

- One way of disseminating information about the capabilities of a new product is through a newsletter or bulletin. Someone on the end-user support staff within IS who has the ability to write comprehensive articles can be given the responsibility for publishing such a document. These periodicals can be used to share experiences among ~~the~~ end users by interviewing the more reasoned computer users.

- Offering training courses to familiarize end users with new products and/or services is another way of selling. IBM has successfully used this training approach to market new offerings for many years. Usually, it's a one-day, hands-on course ~~where~~ ~~that~~ to which individuals from one company are invited to attend. By the end of the days, participants are thoroughly acquainted with the scope of the new product.

2. DEMONSTRATION

- Another m a rketing method that is very effective and easy to employ, is ~~by~~ seeing a product letting ~~the~~ end users actually see how a product works. By demonstrating ~~a product the~~ end users can envision how it might help them with their day-to-day information needs.

- Tours of the information center and the PC center can be scheduled for ~~those~~ employees with an interest ~~to~~ in understand ing ~~the~~ available computing resources. During a ~~tour~~ brief demonstrations can be conducted of each computing resource category. These tours can be given on a regular ly scheduled basis if the size and complexity of the organization warrants ~~it~~. ~~They~~ Tours can be advertised in the newsletter.

3. I.S. MARKETING REPRESENTATIVES

- Under A.2 above, there is a mention of the use of an Account REpresentative or Marketing Rep to improve responsiveness to service requests from end users. Depending on the size of the company, IS Marketing Reps could be assigned "territories" which could include sections, departments, divisions a nd subsidiary companies.

- The Marketing Reps' responsibilities would include:

  - Keeping clients informed about announcements from IS or new products and services.

  - Uncovering opportunities in the clients' area for implementing IS products and services.

  - Assisting ~~the~~ clients in arriving at the most appropriate solutions to a information services problem (personal computer, information center, mainframe, etc.).

- Selling IS services to clients by making formal presentations to individual managers and groups.

- Scheduling clients for courses, demonstrations and tours.

- Liaison for main-line corporate systems development.

o ~~The~~ Marketing Reps should report to the manager of End-User Computing Support, the Information Center manager, or ~~to~~ the manager of Systems Development. In any event, the marketing reps' activity report should be distributed to each of these three ~~functions~~ persons. The Marketing Reps should in turn, be kept appraised of any IS activity planned for their territories.

VI

VI POTENTIAL RISKS OF MAINTAINING STATUS QUO

- o The status quo in this case refers to the situation whereby Information Systems managers ~~who~~ want to build computer-based business systems following the policies, methodologies, and pro~~du~~cedures that have been established for at least a decade. They do not view end-user computing favorably and can see it having no impact on future systems development or the existing request backlog. If they can't prevent the proliferation of personal computers, then they want to ignore the situation.

A. RETURN OF THE APPLICATION ISLANDS

I. REPEATING THE 1950s

- o When computers were introduced to the business world, the first applications were usually devoted to accounting and payroll. The manual process performed in a business section was normally transferred to the computer intact. The data processing staff took its direction from the using department. The impact was transcribed to ~~a~~ keypunch form by the department that received the output reports.

- o As the applications base expanded to include other areas of the organization, the above process was repeated. Each business entity would design report formats to record the activities performed. ~~The~~ Transactions would be batched and forwarded to data processing.

VI-1

colon

o The ~~What~~ result~~ed~~ is illustrated in Exhibit VI-1; disjointed applications with no ability to interact. Accounting claimed to possess the official records, but its data usually didn't match the data kept by the operational units. Walls of aminosity arose ~~rose~~ between the various business functions. Executive management gave little credence to the information produced by data processing. Out of this dilemma spr~~i~~ang grandiose concepts~~,~~ such as "integrated business systems" and "management information systems." It took years before a systems architecture was designed by the joint efforts of the ~~those~~ business functions directly affected.

2. PREDICTABLE PROBLEMS

o INPUT believes that if end users are allowed to build their own systems without the benefit of the experience gained by IS over the years, there will be ~~is~~ a good chance of repeating some of the aforementioned systems problems.

o If ~~the~~ end users go unchecked, ~~they~~ stet will continue to move more and more of their data processing activities to computer resources over which ~~they have~~ stet direct control. They will learn how to use programming languages and, eventually, will create some fairly comprehensive systems. What they won't realize is that they will be building application~~s~~ islands and repeating the history of the information services industry.

B. CHAOS THROUGH IGNORANCE

o Many end users have been working closely with IS over the years to build ~~building~~ and use ~~using~~ computer-based systems. When microcomputers were introduced it was only natural for these end users to assume they kn~~o~~ew all the fine points of employing computer technology. Unfortunately, they are ~~have been~~ unaware of the problems caused by their piecemeal approach to computing.

1. INCOMPATIBILITIES

- o As illustrated in Exhibit VI-2, 90% of the respondents for this study believed the issuance of microcomputer standards is of high importance. They recommend a limited number of microcomputer brands and configurations from which end users can choose. VI-2

- o Without stand~~alones~~ards, ~~the~~ end users are at the mercy of ~~the~~ vendors. This ~~which~~ will result in the purchase of solutions that may only satisfy one particular problem and provide no future growth or connectability with other systems.

- o Another major problem is the purchase of hardware and/or software that soon will be obsolete. The end user may be unaware that the product will not be supported by the vendor or, even worse, that the vendor is in the final stages of going out of business.

2. DUPLICATIONS AND REDUNDANCIES

- o If the efforts of ~~the end~~ users ~~of~~ microcomputer~~s~~ are not guided and coordinated by IS, ~~then~~ there is a good chan~~g~~ce that many different solutions to the same type of problem will be purchased or developed throughout the organization.

- o By using incompatible hardware, software, and data media, ~~the~~ end users will discover that reconciliation and data exchange will be nearly impossible. At the onset of microcomputing, ~~the~~ end users may not have the foresight to recognize potential incompatibility problems. This is one of the main reasons why IS must take an active role in end-user computing.

- o Exhibit VI-3 illustrates the age-old problem of maintaining duplicate data for a variety of applications. VI-3

3. RISING COST OF COMPUTING

- Even though most microcomputer products are inexpensive, without some standards, ~~and guidelines~~ expenses will be difficult to control. Incompatible products can result in additional purchases as ~~the~~ users' needs escalate.

- Many IS organizations are negotiating companywide maintenance contracts with vendors that supply the bulk of the microcomputer equipment. This would not be possible if IS didn't exercise some control over end-user computing.

- Also, by dealing with a minimum number of vendors, IS is in a better position to negotiate discounts. These discounts can be used as an incentive to ~~the~~ end users to stick to the standards and seek help from IS for purchases.

C. TARNISHED SECURITY AND DATA INTEGRITY

1. IMPACT OF LACKING SECURITY PROCEDURES

- Few end users are aware of the need for control in a microcomputer environment. Simple things such as creating backups for vital data files are not even considered. Even physical conditions are overlooked, such as keeping microcomputers away from electric motors and keeping the temperature between 60°F and 90°F. Some don't realize ~~how~~ the sensitivity of floppy diskettes ~~are~~ to heat, pressure, dust, skin oil, and magnetic objects.

- If an application package doesn't provide adequate input, processing and output controls data can easily be overlooked, lost, or tampered. Application system controls of a software package should be required to be reviewed by IS and Internal Audit.

- Documentation of a microcomputer application is no less important than for a mainframe application. End users tend to assume unique ownership of applications they have acquired or generated for their microcomputers. What they forget is that the system belongs to the organization and will ~~would~~ continue to function after they are promoted or leave the company. They must provide instructions on how to operate the system and describe all inputs and outputs and any programming not documented by the vendor.

2. DATA RECONCILIATION PROBLEMS

- Microcomputer users can create discrepancies in data by:
  - Rekeying transactions for their systems that have already been collected for corporate systems.
  - Modifying data that have been downloaded from the mainframe.
  - Using outdated data that have been downloaded from the mainframe from previous generations.
- ~~Here~~ again this is a situation that IS experienced decades ago: Maintaining multiple files with the same data elements will cause data synchronization problems if adequate controls are not in place.
- ~~The~~ end users are not qualified systems analysts and will make the same mistakes that IS has made in the past in learning how to best develop systems. Many problems can be avoided by encouraging ~~the~~ end users to seek assistance from IS.

3. UNRESTRICTED ACCESS TO CONFIDENTIAL INFORMATION

- Along with RACF from IBM, a frequently mentioned access control system being used to protect corporate mainframe data ~~was~~ is ACF~~X~~2 from the

Cambridge Systems Group~~s~~. The access rules of ACF2 allow ~~the~~ data owners ~~of the data~~ to share ~~the data~~ stet using non-hierachical protection levels of read, write, and execute only. ~~There are~~ Access control systems software exist for nearly every mainframe and microcomputer, including DEC PDP11 or VAX, HP 3000, and Wang VS. More security and integrity software is becoming available for microcomputer systems, as well.

- o To ensure the integrity of computer-maintained data, ~~the~~ respondents ~~all~~ agreed that formal procedures should be distributed to end users outlining the steps required to access corporate data. Most large data centers have ~~a~~ full-time security officers reporting to the managers of IS administration. The security officer's are ~~is~~ responsible for both physical security and data security. Escalation security violation procedures as well as formal request procedures for data access are maintained by this position. Internal audit normally would review all security procedures.

- o The respondents unanimously agreed that access approval authority should be the responsibility of the primary using department. If someone wants access to the payroll records, for instance, then the payroll department should grant permission.

- o Security violations can be ~~escalated in the following sequence:~~ Stet

  1) Security function in the data center.

  2) The offender's manager. ~~Manager of the offender.~~

  3) The ~~Owning~~ department that owns ~~of~~ the data.

  4) Corporate security officer.

Marilyn, is this format (numeral w/ 1 parenthesis) acceptable?

- o For more information on the subject of security, refer to INPUT's study ~~entitled~~ Protecting the Corporate Systems and Software Investment. ~~, September 1984.~~

D. DICHOTOMOUS I.S. FUNCTIONS

1. IMPACT OF USER PROGRAMMERS

- ~~Those~~ IS managers who are choosing to ignore the proliferation of personal computers and who believe that end-user computing is a fa~~ce~~d that will soon disappear are in for a rude awakening. End-user computing is a novelty ~~similar to the way~~ like the telephone ~~was a novelty~~ when it was first introduced.

- ~~The potentially~~ Perhaps the most damaging approach to end-user computing is to allow a free-for-all under the guise of liberalism. ~~Either the~~ managers ~~with this attitude~~ who profess such an approach either honestly don't believe ~~the~~ that end users will get too involved in building systems or ~~they~~ believe th~~e~~at latitude will ~~effect~~ offer the best support to end users.

- Currently, most end users of microcomputers are staying away from programming languages such as BASIC, PASCAL, C, FORTRAN, or APL. They primarily use LOTUS 1-2-3 or VISICALC. It is only a matter of time, however, ~~until the~~ before more sophisticated end users will discover the challenge of writing their own programs. If IS doesn't provide any guidelines, ~~the~~ end users are apt to hire programmers themselves to handle some of their more difficult information systems problems.

- The impact of the free-for-all in end-user support will ~~result in a~~ be a sharply rising cost of computing, an insurmountable incompatibility problem, a program maintenance and turnover problem, and the problem of end-users neglecting their primary duties while programming their micros.

2. SPROUTING MINI I.S. ORGANIZATIONS

- INPUT is predicting a migration of programmers and analysts to the operational business functions of an organization. Eventually, it will not be uncommon to find ~~the~~ systems development professionals assigned to line management, with central IS providing technical support, consulting, training, and corporate information systems strategic planning.

- ~~What~~ INPUT is recommending ~~is~~ a strategy that will facilitate this migration in an evolutionary~~,~~ and orderly fashion. Otherwise, if IS does not assume the leadership role in moving computing to the end user~~s,~~ ~~the~~ management throughout an organization will begin to create ~~their~~ its own IS staffs. ~~Lacking~~ A lack of central control and uniformity would result in chaos.

3. USERS' PERCEIVED AUTONOMY

- With no direction from the corporate IS organization regarding the use of computer tools, ~~the~~ various operational business functions will assume they have the right to act according to their best judgment.

- ~~What IS must understand is that computer literacy among the end users is like a cancer; in the beginning there is no pain and it is hardly noticable, and then it starts to spread uncontrolably.~~

- Most corporate policies related to information services are directed toward the use of IS facilities. ~~The~~ End users can assume that microcomputer activity is not under the jurisdiction of any existing IS policy.

- IS must be aware that end-user computing is not merely a passing fad and that the longer end users are permitted to usurp IS in their computing activities the more difficult it will be for IS to gain control.

E. DISSOLUTION OF I.S. AUTHORITY

1. CONCERNS OF SENIOR MANAGEMENT

- Senior management is becoming conscious of the steady growth of microcomputer applications and, in fact, many senior managers have installed micros in their own areas.

- If IS does not have plans ~~in place~~ that indicate how the corporation will assimilate the computer tools for end users, then senior management might turn to the more aggressive microcomputer users for leadership.

2. OUTDATED POLICIES INEFFECTIVE

- Many IS managers believe that because there is a company policy on the responsibilities for computer resources, ~~that~~ they need not worry about the frustrated end users who are looking for ways to solve their information services problems.

- First of all, the policies are usually so old that hardly anyone remembers they exist or what the gist of them might be. Secondly, the use of microcomputers is an all-new ball game~~, which~~ that undoubtedly is not covered in the company policies.

3. USERS FIND THE SOLUTIONS

- Exhibit VI-4 shows the cornerstone of IS authority being undermined by current situations brought about by the end-user computing revolution. The message is that this erosion will continue until the IS authority topples, unless IS assumes responsibility for all information service activities, and becomes the facilitator of end-user computing instead of a roadblock.

VI-4

✓

- As pointed out in INPUT's 1984 End-User Planning Report, the end-user community is growing and ~~the~~ workers who are getting directly involved with computing now include professionals and middle managers as well as ~~the~~ supervisory and clerical staff. This means that employees throughout an organization are becoming aware of the capabilities of ~~the~~ computer tools. If IS is to remain the corporate information services authority, ~~then~~ it must organize to facilitate end-user computing.

VII

VII I.S.—THE POSITIVE FACILITATOR

- This chapter reviews INPUT's findings regarding steps being taken by some of the leading innovators of end-user computing support. INPUT has concentrated on the following areas:
  - The IS organizational structure.
  - Systems development.
  - Training and education for end users.
  - Microcomputer rules and regulations.
  - User involvement in systems development.
  - New IS positions to support end users.
  - Experience with end-user computing users' groups.

A. EVALUATING ALTERNATIVE ORGANIZATIONAL STRUCTURES

- Six ~~Exhibit VII-1 through VII-X~~ 6 ~~present~~ examples of typical IS organizational structures discovered from research are presented. If a function appears to be missing from

any of the organization charts it was done unintentionally. The main purpose for including these charts is to see how various organizations are supporting end-user computing.

VII-1

- The IS executive in company A in Exhibit VII-1 has five direct-reporting managers. One of the five managers has the responsibility for all computing related to end users, including office automation.
    - The advantages of this structure are:
        - End-use computing is recognized as an important function and receives the same level of authority as Systems Development and Operations.
        - Planning, implementation and coordination of all end-user-related computing can be better achieved by ~~growing~~ grouping it under one manager.
    - The biggest disadvantage of this structure is the separation of end-user computing from corporate Systems Development. It is not clear how a request for service is evaluated by both groups to determine the most appropriate solution. This may not be a problem if the two groups meet regularly to share their activities and review service requests.
- It is interesting to note that company A has the communications function under the Operations Manager and the ~~DB~~ data base (DB) management function under the ~~applications~~ systems planning function. INPUT believes that communications and data administration will play an increasingly important role in the growth of end-user computing.
- Company B in Exhibit VII-2 has placed PC support and office systems under the systems development manager who reports directly to the IS executive. This company claimed it did not have a typical information center. Having

VII-2

~~user~~ end-user computing report to the Systems Development manager fosters collaboration on the design of all types of applications. The only drawback would be the possibility of end-user computing taking a back seat to corporate systems development, because of the manager's bias. Also, the planning for personal computer activity is separated from the staff that is actually provid~~ed~~ing assistance and consultation to ~~the~~ end users. There should be a close alliance between these two functions.

- In contrast to company A, company B has telecommunications reporting directly to the top IS position and DB management buried under the Data Center. ~~which~~ This arrangement is not unusual.

- There are four managers reporting directly to the IS executive ~~in~~ at company C in Exhibit VII-3. Here again, as in company A, the activities related to end-user computing, including an information center, PC support, office automation, and local area network planning, report to a manager who reports directly to the IS executive. Communications and DB management both report to a unit called Computer Services, which is primarily operations and technical support. A word processing pool also reports to Computer Services. Comp~~uter~~any C has a department that was not included in either A or B, which is Plans and Controls. Along with the normal administrative functions, such as budgeting, this group also handles security issues and training and education. VII-3

- As in company A, it is not clear how Systems Development and end-user computing support work together to arrive at the best solution to an information problem.

- In Exhibit VII-4 ~~The~~ company D ~~(Exhibit VII-4)~~ IS executive has reduced the span of control to just three managers: ~~1)~~ the Data Center manager, ~~2)~~ Systems Development manager, and ~~3)~~ Communications manager. The Systems Development manager has responsibility for all applications of computer technology, along with all training and education. ~~They have~~ The company has a PC center as well as an information center. This simple structure has merit if ~~they~~ it makes the effort to integrate the applications as much as VII-4

possible. It seems that this type of structure may encourage the use of prototyping ~~did~~ and pilots with the end-user support centers under Systems Development.

- o Some companies have already taken steps to move Systems Development from IS to the operational business units. Corporate IS, ~~in~~ at company E, ~~on~~ in Exhibit VII-5, is organized to provide support and production services, but all systems development has been decentralized. Each major division has its own programmers and analysts, along with an IC/PC consultant. Company E not only has distributed systems development, but also has distributed data processing utilizing HP3000s. Note that technical support has responsibility for the information center, microcomputer strategies, electronic office, data base management as well as the normal systems programming function. Education and security are under a group called Administration. VII-5

- o It was not made clear how the integration of corporate systems is accomplished at company E. INPUT assumes that corporate IS has a systems development staff that ~~has the~~ is responsib~~ility~~le for coordinating systems integration activities. Also, the divisions' consultants must have an open line of communications with the corporate technical support staff to keep abreast of tactical and strategic end-user computing plans.

- o In Exhibit VII-6, company F ha~~d~~s one of the most complex IS structures of the companies interviewed, with three large data centers located in different states and two information centers. Each information center has responsibility for personal computer support and training. It is interesting to note that end-user computing support in company F is four levels under the top IS executive and reports to the communications and office systems manager. Having end-user computing support report to the communications manager has some merit because of the trend to link all information processing resources together. The major concern with the company F organization is the wide separation between corporate systems development and end-user computing. It appears that the company views these two functions as being mutually exclusive, which could cause some problems in screening IS service requests. VII-6

B. SYSTEMS ARCHITECTURE WITH MICROS AND MINIS

1. TOTAL SYSTEMS REQUIREMENT AWARENESS

- INPUT believes that end-user computing and conventional systems development are not mutually exclusive. There should be coordination between the two functions and collaboration whe~~r~~never possible. The systems development staff should understand the capabilities of the end-user computing resources to be able to integrate those tools in the design architecture of a system whe~~r~~never feasible.

- Programmers and analysts should be assigned to the end-user computing support groups for a period of time (six months to a year) to assure that they understand the total information needs of ~~the~~ end users and to gain first-hand experience with ~~the~~ end-user computing tools. Rotating the systems staff through the end-user computing support group is the best way to instill an awareness of ~~the complete~~ all IS capabilities.

- Even if the systems development staff is decentralized and dispersed over a large geographic area, ~~it~~ staff members should receive indo~~r~~ctrination on the functions and features of the corporate-preferred end-user computing tools. Individuals could spend some time working in the local information centers or, at minimum, could receive training and education from the corporate end-user computing support staff.

2. OPEN MIND TO ALL SOLUTIONS

- IS should have a technical planning function ~~which~~ that would be comp~~ri~~osed of experts in hardware, software, and communications. The main responsibility of this unit would be to evaluate information products and services~~,~~ and assess

their applicability to the solution of the organization's information systems problems. Technical strategies would be developed by this unit, including the possible integration of micros, minis, and mainframes.

o Proposals prepared by the systems development staff or the end-user computing staff would be forwarded to the technical planning unit for review and approval. The review would be conducted to make certain that:

- stet The proposal fits in the overall technical strategy.

- ~~That~~ the best possible technical solution is being proposed.

- ~~That~~ currently installed products will be used if possible.

- ~~That~~ the systems development staff coordinates with the end-user support staff when necessary.

o This technical "signoff" should be ~~a~~ part of the systems development methodology procedures approved by the IS steering committees.

caps istributed Data PROCESSING IV

3. D~~D.P.~~ AS AN ALTERNATE

o INPUT believes there will be considerable activity in the area of distributed data processing & DDP during the next several years. The push is to put more computing power in the hands of ~~the~~ end users, stet and what better way ~~is there~~ to do this ~~to achieve this goal~~ than through DDP?

o The advance~~ment~~s made in the microcomputer industry in the past few years are providing the capabilities, and cost/performance needed to support distributed systems. INPUT envisions individual workstations connected to medium-sized mainframes such as the IBM 4361, ~~or~~ the DEC-VAX, or the HP 3000, serving local needs of divisions within an organization, and the medium-sized computers connected to a corporate host mainframe. At least, more

microcomputers will be linked to the corporate mainframe to provide multifunctional capabilities.

- What are the IS organizational implications of DDP utilizing microcomputer technology for individual workstations? If the microcomputer is to become an integral part of future systems design, then it seems logical that the systems designers will have to be well versed in micro, mini, and mainframe capabilities and applications. This implies a blending or merging of these disciplines. Future systems architecture will take into consideration the computing needs of the individual worker, along with the total systems requirements.

- If the primary intention of a multiprocessor distributed system is to provide flexible computing power at each strategic location of an organization, then distributed systems development should be included. INPUT has predicted that as computer technology becomes easier to use, the systems development professional will become more business oriented. ~~The~~ Business systems analysts will be assigned to the business unit for which they have expertise. More companies will adopt the IS structure depicted by ~~in Exhibit VII-5~~ Company E ~~)~~ {Exhibit VII-5}.

VII-7

- The future distributed system will resemble the layout in Exhibit VII-7. At the lowest level, workers will interact with either a distributed processor or a large host processor by means of a microprocessor or intelligent workstation. stet The worker will be able to process business transactions, prepare reports, and draw graphics from corporate data. The system will provide ~~provide~~ simple local accounting, along with office functions such as word processing and electronic mail. Security and control procedures and software selection would remain the responsibility of the corporate IS security department.

- Education will become a key issue for the corporate IS organization if data processing becomes truly distributed. If systems design, development, and implementation become the responsibility of the local business units, then

standards, guidelines, and new technology will be disseminated through education.

C. EDUCATING ~~THE~~ END USERS

I. WHO, HOW, WHY?

- Education and training are ~~perpetuities of~~ perpetual needs in information systems. Senior management, middle management, professionals, clerks, and administrators all require familiarization with computer technology. Those employees building their own systems require detailed training on the various products being implemented. If the systems development function has moved out to the operational business units, then corporate IS must keep those people up-to-date.

- Education and training can be offered in a variety of modes depending on the circumstances and intent. Familiarization courses are usually conducted in a formal classroom environment and ~~we~~ are used to convey ideas and concepts. An end user learning to use a piece of software or hardware can best be taught in a one-on-one situation. The end user in this case could go to the information center or the microcomputer center for individual training. ~~The~~ Vendors will provide some training and education, which ~~the~~ corporate IS instructors should receive.

- ~~There are~~ Some subjects are offered through audio and visual educational services; these may be attended by ~~which~~ anyone with a need to know ~~could attend~~. If the company has a full network, computer-aided training can be developed by the corporate instructors and made available to everyone on the network. Even the marketing approaches outlined in Chapter V are educating vehicles: ~~other vehicles are~~ demonstrations, tours, and newsletters. For more information on the subject of training, refer to INPUT's ~~June 1984~~ study, ~~entitled~~ Training Techniques for End Users.

- o Keep in mind that education is a two-edged sword. Not only does the student learn specific information about a topic, but IS has the opportunity to instill good habits with regard~~s~~ to controls and security. Standards and guidelines can be explained and encouraged during a training session.

- o A formal education and training unit consisting of four or five instructors can be found in any one of several IS departments: Administration, Plans and Controls, Technical Support, Systems Development, and Personnel and Training. Th~~is~~ese groups normally ~~has~~ have responsibility for the following types of education:

  - Introducing new products or methodologies to the IS staff.

  - Training entry-level programmers.

  - Computer familiarization for management.

  - Computer literacy classes for end users.

- o The one-on-one training for end users is usually conducted by an information center consultant.

2. WHAT?

- o ~~There is~~ much has been written on the importance of computer literacy for end users, which emphasizes teaching end users how to use software packages or new pieces of equipment. The basic elements for information systems development have been missing, however. As end users move more of their work to the computer, it will become critical that they understand the importance of all aspects of information systems development.

VII-8

- The topics ~~of~~ listed in Exhibit VII-8 are typically overlooked in computer literacy courses for end users. These topics can be covered in a classroom environment or by an IS consultant at the time that assistance is being extended to an end user for systems implementation. Some companies are using a modified version of their systems development methodology procedure to help end users understand all aspects of computing.

D. ESTABLISHING FLEXIBLE RULES AND REGULATIONS

I. BALANCING SERVICE AND CONTROLS

- Care must be taken to avoid end-user computing controls that are so rigid ~~that~~ they discourage anyone considering using microcomputers or the information center. The objective should be to promote the idea of end users helping themselves solve their own information systems problems while, at the same time, providing central control of this migration to end-user computing.

- The ideal situation is one in which ~~where the~~ end users believe their best interests will be served by turning to IS for guidance and recommendations. This can only be achieved by providing the incentives that will motivate ~~the~~ end users to seek IS help.

- Compatibility standards should provide an adequate range of microcomputer vendors and configurations to satisfy the anticipated needs of all business functions. ~~The~~ end users should understand that they may acquire products outside of the recommended list, but that there will be no IS support provided.

- Passing on discounts ~~to the end users~~ obtained from volume purchases can provide some incentive for end users to adhere to the configuration standards. Marketing the supported equipment and software packages is one of the best ways to ensure central control. In other words, sell ~~the~~ end users on the established standards.

- Sixty-five percent of the respondent companies have a policy prohibiting end users from writing their own programs. Most of the remaining 35% said ~~that~~ they didn't prohibit ~~the use of~~ end users from programming languages ~~by the end users,~~ but they have made it clear that IS will not provide any assistance for end-user programming. A few companies are ignoring this issue, claiming that ~~the~~ end users have no inclination to write their own programs, but that if they do want to program, IS will have no objections.

2. THE END-USER STEERING COMMITTEE

- Nearly every organization has a committee that deals with the control of ~~the~~ corporate information services resources. Some are called steering committees and others are referred to as coordinating committees. There are usually about a dozen individuals on these committees from executives, middle managers, and IS management. Some companies include a representative from Internal Audit.

- A few firms have established separate steering committees for issues related to end-user computing. Most rely, however, on one IS Steering Committee to handle all computer-related matters.

- The most frequently mentioned function performed by the committee ~~was~~ is the review of cost/benefit analyses and the approval of systems proposals. The second most frequently mentioned function ~~was~~ is policy setting followed by hardware and software approvals. A few get involved in settling conflicts and disagreements.

3. THE POLICY STATEMENT

- Over and above compatibility standards and systems development guidelines, should be a policy issued by the IS Steering Committee covering issues related to the acquisition and use of microcomputer hardware and software.

- ~~It was the concerns of the~~ respondents expressed concern that the following end-user computing issues ~~should~~ be covered in an end-user computing policy and that ~~under these conditions~~ approval to proceed would be required from the steering committee or corporate IS ~~under these conditions:~~ for the following systems:

  - Any transaction-driven system that feeds data to a corporate IS system.

  - Any system that supports multiple users (either one at a time or concurrently).

  - Systems requiring communications with other processors (inside or outside the company).

  - Systems requiring program development.

  - Systems requiring access to corporate data.

  - Systems dependent on key personnel or unique equipment configurations.

- The above rules could be issued in a set of guidelines for end-user computing, but it must be backed by a high-level authority, like a senior officer. The rules are not prohibiting this type of systems activity; they are only requiring IS cognizance.

- Exhibit VII-9 ~~is~~ suggest~~ing~~s that IS publish and maintain an end-user computing manual that ~~can~~ could be issued at the time an end user becomes an active participant in computing, or could be issued to all department heads in the same manner as any corporate policies and procedures. This manual would be the responsibility of the end-user computing support groups within IS, which is most cases tends to be the information center.

VII-9

E. MORE PILOTS AND PROTOTYPES

- INPUT predicts more use of pilot projects and systems prototypes in the future of end-user computing. These are two approaches that IS can use to help its image as a positive facilitator.

- The pilot approach can be applied to any number of systems scenarios. The idea is to implement a concept on a small scale, to be evaluated and scrutinized by the experts before a total commitment is made. This could apply to a microcomputer device or to a software package. ~~The introduction~~ a ~~to~~ local area networking could be ~~done~~ introduced through a pilot system. Any of the electronic office tools and schemes could first be proven beneficial through a pilot installation.

- The personal computer center provides an excellent controlled environment to try out new microcomputer hardware and software products. IS consultants could assist ~~the~~ sponsoring end users in installing the pilot product, and both groups would be in a good position to assess ~~its~~ the pilot product's capabilities and performance.

- A pilot is especially beneficial on any product that is intended to be installed companywide. All of the bugs, mistakes, and general problems can be ironed out in the pilot before scheduling the subsequent installations.

- ~~With~~ nonprocedural, parameter-driven report writers and query languages that are integrated with data dictionaries, along with interactive screen generators and adaptable data base management systems, prototypes ~~are~~ compress~~ing~~ the systems development life cycle. by means of

- Building a physical model of a proposed computer application should be accomplished through the joint efforts of two IS groups, the systems development staff and the

end-user computing support staff, and the end-user personnel ~~being~~ affected by the change. Prototypes can be developed at the information center by ~~the~~ end users with assistance from the two IS groups.

- One of the main reasons for using a prototype for building a system is to uncover all of the requirements before detailed design begins. A working model facilitates the interactive process that every systems development project must endure.

- Prototyping truely involves ~~the~~ end users in the systems development process. They can help build the model and collaborate on establishing the total specifications of the system. Some prototypes become interim working systems that can provide benefits quickly while the total system is being developed.

F. EMPHASIS ON CONSULTING

- During the past few years the title of consultant has crept into ~~the~~ IS job descriptions. It has mostly been associated with the information center where end users receive assistance from the IS staff on how to use the facilities and tools to analyze data and prepare reports and graphs.

- As the use of microcomputers started speading throughout organizations the information center assumed a new responsibility. ~~The~~ end users wanted help on designing applications preparing justifications, selecting ~~the~~ tools, developing controls, ordering equipment, implementing the system, and learning to operate the system~~, and implementation~~. This consultation, training and technical assistance fits the description of a consultant.

- As more IS work is off loaded to the end users with ~~their~~ microcomputer workstations connected to companywide networks, IS's role as a consulting entity will continue to grow.

IS personnel

- ~~They~~ aren't referred to as consultants in ~~too~~ many companies ~~as of~~ yet, but experts in communications, network planning, microcomputer strategies, data management, office automation, and any other highly specialized areas are all basically consultants. IS management uses them as consultants and so do ~~the~~ end users.

- If ~~there will come a time when~~ all systems development is decentralized by each major functional business operation, then the IS core remaining will be made up of the aforementioned specialities. IS's primary job will be consultation, training, and technical assistance. IS will still have overall authority for strategic information resource planning and will remain the central coordinating function for corporate data management and systems integration. IS's technical expertise will continue to expand as the information resources move towards integration.

G. ESTABLISHING END-USER COMPUTING USERS' GROUPS

✓

- In December 1982 INPUT published a report entitled Personal Computers in the IS Strategy, which focused on strategies that IS could adopt to maximize personal computer benefits. Within the report there is a section on internal users' groups for personal computer users. The next two paragraphs are extracts from that 1982 report. ✓

- The internal user group is a good, low-cost means of collecting and disseminating internal information, users' experience, and vendors' announcements, as well as data collected from publications and other sources ~~which~~ that are of actual or potential interest to a company; if the plethora of information that is available is not sifted through, the "trees" will obscure the "forest." Defined areas of interest include:

- Hardware (vendors, devices, functions, and features).

- Industries (~~which~~ that are similar to the company's).

- Applications (particularly important for software).

o Special-interest areas within the user's group should be set up to focus knowledge and information. Examples include:

  - Hardware enhancements.

  - Communications.

  - Software packages--nonapplication.

  - Software packages--application (this may be further subdivided).

VII-10

o Currently, as shown in Exhibit VII-10, 35% of the companies supporting end-user computing have established user's groups. Forty-five percent do not have ~~a~~ user's groups in place, but are planning to organize ~~one~~ groups in the near future. Of the remaining 20%, some companies believe they are too large and geographically dispersed to be able to administer such an activity, and others felt that ad hoc meetings between users are more effective.

o The companies that agree that the formal user group has merit, believe the group should be by the end users and for the end users; ~~much like the bylaws~~ these companies believe that group bylaws should be similar to those of ~~the~~ IBM users' groups, GUIDE and SHARE. IS should provide program material and be responsive to recommendations, but should not manage the affaires of a PC users' group.

o In many large metropolitan areas, groups of this nature are organized for the general public. In southern California, for instance, there is PCPA, Personal Computer Professionals Association.

o The following are ~~some~~ comments received when respondents were asked to identify the potential problems and pitfalls of a users group:

- IS may dominate the group and try to use it ~~so~~ as a vehicle to enforce standards instead of to solv~~ing~~e business problems. This is why IS should ~~only~~ be allowed to participate only in an advisory capacity.

- Screening out recommendations could be a problem. Instead, ~~E~~each recommendation could be directed to the appropriate special interest group.

- Agenda must be geared around the interests of the majority.

- Getting individuals to share ideas and submit suggestions could be a problem.

- ~~The~~ sophisticated users will dominate the meetings, which will intimidate the mov voice; ~~which~~ this can be avoided by having differenet sessions.

- Vendors should be screened by IS before being allowed to address the users group.

o A good way to get started on the organization of a users group is for the end-user support group within IS to publish a newsletter. After whetting the users' appetites for more exchange of information with several issues of the newsletters, IS could announce the charter meeting. IS will have to help get the group established, but then they should take on an advisory role.

VIII

VIII CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

- IS has been organizing and reorganizing to support end-user computing. throughout the history of digital computer technology in business~~,~~ The impetus for this ev~~a~~olu~~a~~tion has not come from IS, however, but from the manufacturers and suppliers of the technology. In fact, the first reaction of most IS managers to a major breakthrough in information services methodologies is skepticism. IS initially did not have the foresight to recognize the impact of the following milestone~~:~~s

  - High-level programming languages.

  - Report Program Generator (RPG).

  - Direct access storage devices.

  - On-line teleprocessing.

  - Virtual storage, virtual machines.

  - Networking.

  - Distribut~~ive~~ed data processing.

- Micro-technology.

- Personal computing (spreadsheets, word processing, graphics).

- Office automation.

o Over the years IS has been forced to concentrate its ~~energy~~ efforts and resources on the main line functions of industry. ~~The~~ automation of the business process es ~~of a business~~ has been the big push, be ~~it~~ they retailing, financial services, or manufacturing. The computer has been used primarily to speed up the processes by eliminating manual intervention, by providing accurate and timely calculations, and by communicating the actions of the various functions within a business.

o Some of these main line applications are so huge and involved so many different operational units and transactions that their development life cycle can consume years of time and millions of dollars. Because of the complexity of these systems it is not unusual for target dates to be missed and requirements overlooked.

o Individual managers from the operational business functions have wanted more control ove their own destiny ies with regards to the information they need to control ~~and~~ ; managers want to direct those things over which they have responsibility. They have wanted to become more involved in the development of systems and ~~have become~~ are frustrated by the lack of responsiveness, slow turnaround, and high costs of the IS organization.

o IBM, along with a plethora of other suppliers of information products and services, ~~have~~ has continued to respond to the pleas of ~~the~~ end users by bringing computer power closer and closer to the individual workstations. Some of these capabilities have been in conjunction with the mainframe resource developments; ~~and~~ others, such as the microcomputer, have bypassed traditioanl computing.

- IS has the responsibility to provide whatever information resources are required by each business function to carry out duties. ~~its mission for the organization.~~ In order to do this satisfactorily, IS ~~must~~ (stet) investigate and evaluate innovations in computer technology and methodology to ascertain ~~the~~ applicability to the information needs of the organization.

- The successful IS organizations are dynamic. They are flexible and they change in structure to best realize the benefits of a new product or service. They are open-minded and willing to keep sight of the problems being solved. They want to be on the leading edge as long as it will assist in meeting the goals and objectives of the firm being serviced.

- ~~The~~ technology is rapidly taking the information services industry down the path of distributed systems development and distributed computer power. IS must be aware of these phenomena and establish strategic organizational plans that will facilitate this inevitable migration.

B. RECOMMENDATIONS

- Based on the projections made in this report for the computer industry, conceptualize how information might be disseminated throughout the organizationin three to five years.

- Knowing the level of dependence the particular industry has o an computer technology and how the organization has adapted to the technology in the past, project where the company will be with regard~~s~~ to:

  - Local area networks.

  - Micor-~~to-~~mainframe links.
    stet

- Micro-to-mini-to-mainframe DDP,
- ~~Micro tomini mainframe DDP~~.
- End-user-developed systems.
- Prototyping.
- The systems development life cycle.
- Systems development methodologies.
- Electronic office systems.
- Communications.

o Once the environment has been projected, the stages of organizational change must be identified. What new functions and skills will be required at each stage? What new management positions must be created? How should the responsibilities be divided among the management positions?

o If not already established, a small staff of highly qualified technicians with divers~~ified~~e backgrounds should ~~be~~ form~~ed~~ ~~into~~ a technical planning function. This staff function should be over and above the technical support group and should report directly to the IS executive. This group should identify and research concepts and products ~~which~~ that could fit into the overall information services scheme of the organization. Technical strategic plans would be developed by this group. Also, this group would review requests for hardware and/or software and furnish recommendations to IS management or an approval board.

o Most of the Fortune 1000 companies have an information center in place. In fact, some of the larger, geographically dispersed organizations have information centers located at each major division. ~~The~~ end users may visit these centers

and learn how to use terminal devices to access the mainframe computer to perform functions, such as analysis and modeling, data base query and report writing, graphics, and communications. INPUT recommends expanding th~~is~~e ~~concept~~ center to include a copy of all micro-equipment and associated software that has been approved by the end-user steering committee. By including the supported micro products, IS would offer a complete information resource center.

o The information resource center could also be used to test pilot projects and to install equipment and software for a trial period. The staff at the information resource center should have responsibility for all aspects of end-user computing, including timesharing and office systems. This will provide ~~the~~ end users with one source of support for their computing endeavors and will provide IS with a united force in planning end-user projects.

o Eighty percent of the companies surveyed for this study either have an established internal ~~end-user~~ stet computing users' groups or are planning ~~on one~~ them in the near future. This is highly recommended as a means to foster communications among the various business functions ~~about the~~ on available end-user computing products and services. ~~The~~ novices can learn from the experiences of the more seasoned end users, and the more seasoned end users can assist in selecting future products and services. This type of ~~an~~ association will help IS to achieve an orderly and planned migration to end-user computing and will help avoid possible haphazard results.

o INPUT recommends establishing ~~Call it~~ a coordinating committee, a task force, a review board, or a steering committee, ~~but establish~~ an authoritative body of senior managers and IS representatives to oversee the end-user computing activities. This will become very important with the installation of local area networks and increased micro-to-mainframe links. End-user computing will become sophisticated and will demand more information resources ~~which~~ that will require the review and approval of a mutual group of managers.

- As ~~the~~ end users increase their knowledge and understanding about the capabilities of ~~the~~ available computer tools, they will be anxious to see how they can put the tools to work for themselves. It is no longer just a matter of submitting a request to IS for service~~,~~ and then sitting back ~~and~~ to wait~~ing~~. ~~The~~ End users can now make things happen themselves. What they need from IS is consultation. INPUT stresses the importance of a marketing approach to end-user computing~~:~~ IS should view ~~the~~ end users as clients and should sell them on the benefits of using available products and services. IS should use IBM's marketing strategy, ~~of~~ with announcements, demonstrations, introductory familiarization courses, and tours.

- IS should develop strategic organizational plans for the next three years that will indicate the skills required as the scope and objectives of the IS function expands. These plans should be updated to accommodate advances in information technology and/or changes in the direction of the firm being serviced. When developing these plans, consider the impact of alternate information services methodologies, such as distributed systems development and distribut~~ive~~ed data processing using microprocessor-based workstations.

- Exhibit VIII-1 summarizes the action steps that INPUT recommends to facilitate end-user computing. ✓ VIII-1

- INPUT believes the future for IS will be challenging and rewarding. Computer technology is well on its way to providing direct support to ~~the~~ office workers in every industry. With electronic office systems, personal computers, and information centers, literally everyone who requires information to perform their duties will be potential ~~"~~end users~~"~~.

- INPUT recommends that the strategic organizational plans include the immediate establishment of a corporate information resource center (IRC) as outlined on Exhibit VIII-2. The center would have a director reporting to the senior IS executive. If ~~there were needs for~~ regional IRCs are needed, they would report to the corporate director to assure uniformity and control. ✓ ✓ ✓ VIII-2

- The corporate IRC would be responsible for all aspects of computer technology support to end users and would receive direction from a policy-setting steering committee and from recommendations from the corporate end-user computing users' groups.

- An IRC planning function at the corporate level would publish corporatewide standards and guidelines as well as develop strategic end-user computing plans. ✓ This group would also ensure operational uniformity among all IRCs and would act as liaison between the corporate IRC and the systems ✓ development~~s~~ functions throughout the organization.

- Another unique function of the corporate IRC would be marketing. This unit ✓ would have the responsibility of selling ~~the~~ end users on the services of ~~the~~ IRC. General ~~familiarization~~ education ~~would fall under~~ are the duties of this unit along with tours and demonstrations. Bulletins announcing new products or concepts ~~would be published by the~~ is group ~~announcing new products or concepts~~. ✓✓ Pilot projects and vendor trials stet could be coordinated by this unit.

- The wave of the future is to put computing capabilities directly in the hands of the workers of every industry. IS must make this happen by providing the skills, experience, and organization to facilitate this ~~marketplace.~~ information systems migration.

U-COR

EXHIBIT II-1

THE CHANGING ROLE OF I.S. FROM SYSTEMS DEVELOPER TO CONSULTANT

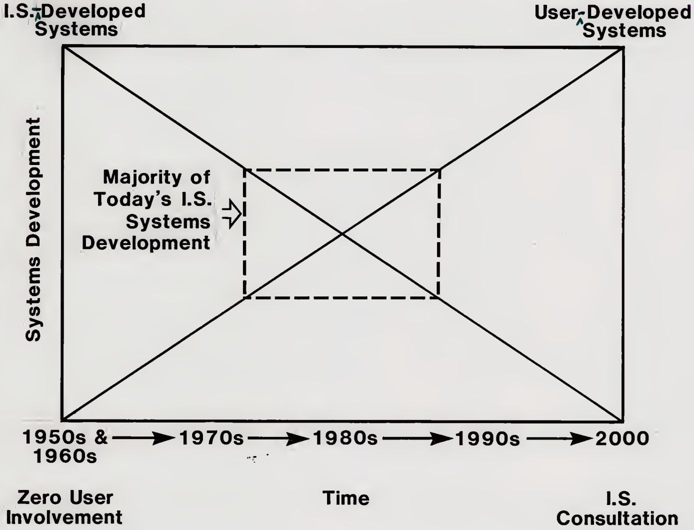

I.S.-Developed Systems
User-Developed Systems
Systems Development
Majority of Today's I.S. Systems Development
1950s & 1960s
1970s
1980s
1990s
2000
Zero User Involvement
Time
I.S. Consultation

EXHIBIT II-2

ORGANIZING FOR END-USER COMPUTING SHOULD INCLUDE AN INFORMATION RESOURCE CENTER

The Information Resource Center

Information Center/Microcomputer Center

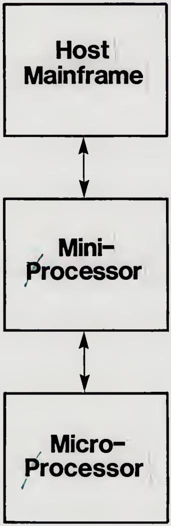
- Pilot Projects
- Trials
  - Hardware
  - Utilities
  - Applications

- Training/Education
- Consultation
- Technical Support
- Special Programming
- Prototype Support
- Data Management

EXHIBIT II-3

Z

FUTURE I.S. ORGANIATIONS


Host Mainframe
Mini-Processor
Micro-Processor

Host Mainframe

- Systems Integration
- Corporate Databases
- Corporate DP

Mini-Processor

- Departmental DP
- Database Support for End-Users
- MIPS Augmentation
- Corporate Systems Interface

Micro-Processor

- Office Systems
- Personal Computing
- Corporate Systems Interface
- Timesharing

EXHIBIT II-4

LIP SERVICE IS A DANGEROUS APPROACH

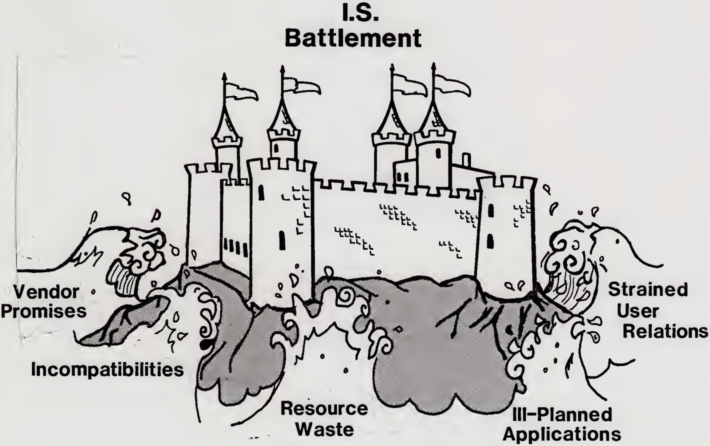

I.S. Battlement
Vendor Promises
Incompatibilities
Resource Waste
Ill-Planned Applications
Strained User Relations

EXHIBIT II-5

VIEWING END-USERS AS CLIENTS IS IMPORTANT

- **Consultation**
  - **Technical Assistance**
  - **Application Justification**
  - **Systems Design**
  - **Hardware/Software Selection**
  - **Negotiation**

- **Education and Training**
  - stet **~~Familiarization~~ ~~of~~** with **New Products**
  - **Implementation of Hardware/ Software**
  - **Instruction on Standards**

- **Marketing**
  - **Demonstrations**
  - **Tours of I.S. Facilities**
  - **Newsletters/Bulletins**
  - **Discounts on Approved Products**
  - Introductory Education

EXHIBIT II-6

SYSTEMS ARCHITECTURE CONSIDERATIONS SHOULD INCLUDE ALL INFORMATION RESOURCE TOOLS

STAGE 1: Traditional Information Systems Development

STAGE 2: Add Information Center for End-User Computing

STAGE 3: Add Personal Computer Support to the Information Center

STAGE 4: Add Responsibility for Office Systems Development to the Information Center

STAGE 5: Merge the Information Center With the Traditional Systems Development Function

STAGE 6: Distribute Systems Development Activities to the Line Operations

EXHIBIT II-7

THE PERSONAL COMPUTER USERS GROUP CAN PROMOTE UNIFORMITY AND COMPATIBILITY

- End-Users
  - Share Experiences
  - Express Needs
- Information Systems
  - Provide Technical Direction
  - Evaluate Suggestions and Recommendations
  - Coordinate Presentations and Demonstrations
- Vendors
  - Present Proposals
  - Make Announcements
  - Provide Ideas and Concepts

EXHIBIT II-8

I.S. MUST PROVIDE THE LEADERSHIP AND TALENT

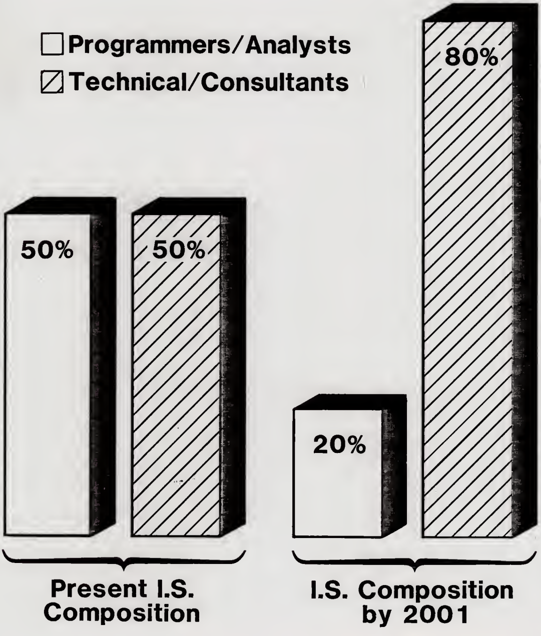
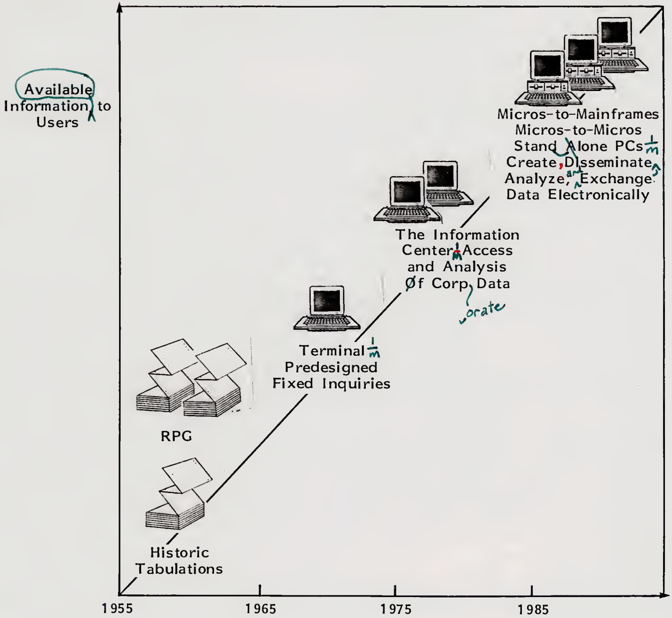


EXHIBIT III-1

THE EVOLUTION OF END-USER COMPUTING



Available Information to Users
Historic Tabulations
RPG
Terminal Predesigned Fixed Inquiries
The Information Center Access and Analysis Of Corp. Data
orate
Micros-to-Mainframes
Micros-to-Micros
Stand Alone PCs
Create, Disseminate,
Analyze, and Exchange
Data Electronically
1955
1965
1975
1985

EXHIBIT III-2

USER-DEVELOPED SYSTEMS HISTORY, STAGE ONE

DATA MANIPULATION AND RPG

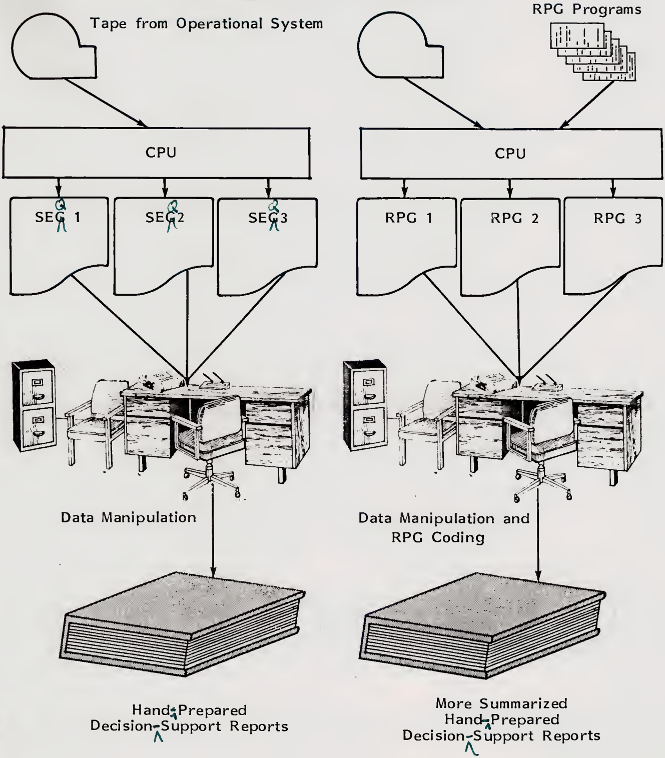

Tape from Operational System
RPG Programs
CPU
CPU
SEG 1
Q
SEG 2
Q
SEG 3
Q
RPG 1
RPG 2
RPG 3
Data Manipulation
Data Manipulation and RPG Coding
Hand-Prepared Decision-Support Reports
More Summarized Hand-Prepared Decision-Support Reports

EXHIBIT III-3

USER-DEVELOPED SYSTEMS HISTORY, STAGE TWO

TERMINALS

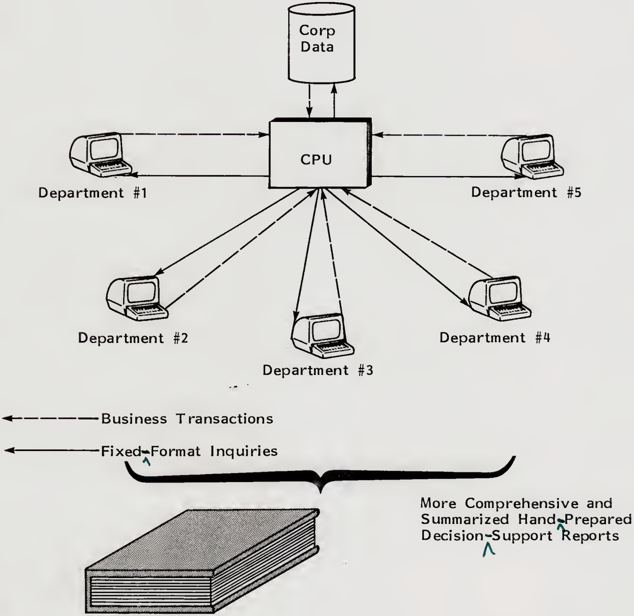

Corp Data
CPU
Department #1
Department #5
Department #2
Department #3
Department #4
Business Transactions
Fixed-Format Inquiries
More Comprehensive and Summarized Hand-Prepared Decision-Support Reports

EXHIBIT III-4

USER-DEVELOPED SYSTEMS HISTORY, STAGE THREE

THE INFORMATION CENTER

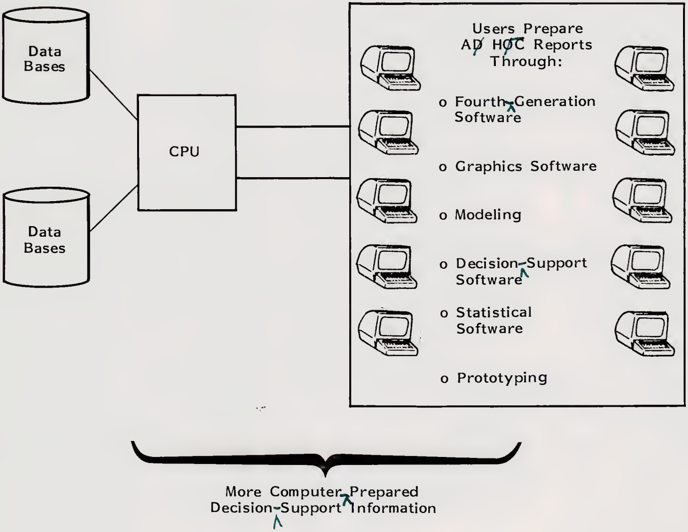
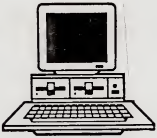

Data Bases
Data Bases
CPU
Users Prepare AD HOC Reports Through:
o Fourth-Generation Software
o Graphics Software
o Modeling
o Decision-Support Software
o Statistical Software
o Prototyping
More Computer-Prepared Decision-Support Information

EXHIBIT III-5

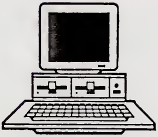
USER-DEVELOPED SYSTEMS HISTORY
STAGE FOUR

STAND ALONE MICROCOMPUTERS

- o Spreadsheets
- o Word Processing
- o Application Packages



Department "A"



Department "E"

Department "B"

Department "D"

Department "C"

Decision-Support Information
For Individual Managers

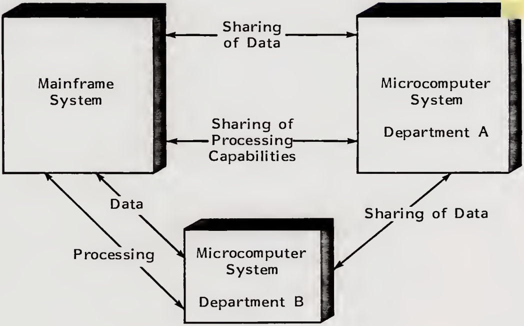
EXHIBIT III-6

USER-DEVELOPED SYSTEMS HISTORY)

STAGE FIVE

SHARED FUNCTIONALITY

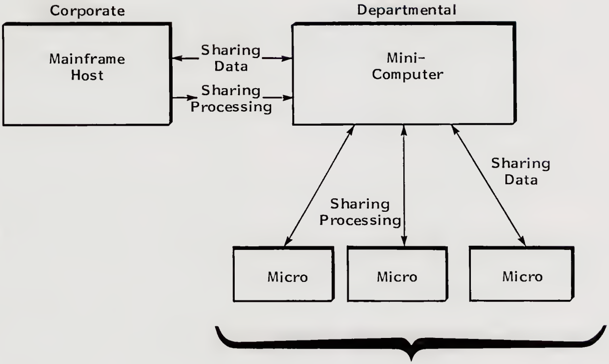
Graphics try same line breaks on identical titles (stages #1-5)


Mainframe System
Sharing of Data
Sharing of Processing Capabilities
Microcomputer System
Department A
Data
Processing
Sharing of Data
Microcomputer System
Department B

Computerized Decision-Support Systems
Local and Corporate

EXHIBIT III-7

USER-DEVELOPED SYSTEMS HISTORY,
STAGE ~~6~~ SIX


Corporate
Mainframe Host
Departmental
Mini-Computer
Sharing Data
Sharing Processing
Sharing Processing
Sharing Data
Micro
Micro
Micro

Individual Microprocessor Workstations:

- Transactions; Input/Edit
- Corporate Data Analysis and Modeling
- Decision Support Systems
- Electronic Office Systems
- Report and Graphic Preparation

EXHIBIT VI-1

MAIN LINE SYSTEMS MENTALITY

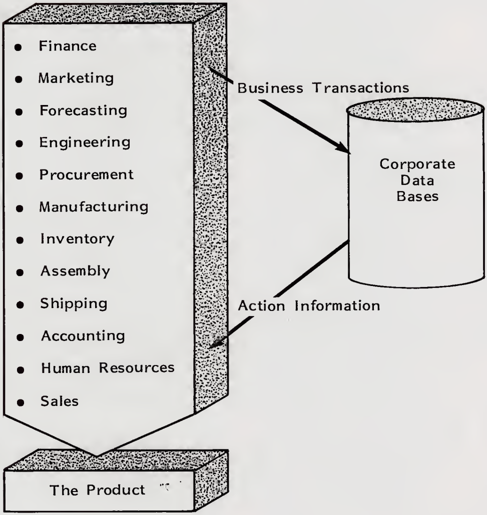

Finance
Marketing
Forecasting
Engineering
Procurement
Manufacturing
Inventory
Assembly
Shipping
Accounting
Human Resources
Sales
Business Transactions
Corporate Data Bases
Action Information
The Product

EXHIBIT IV-2

INFORMATION SYSTEMS BUREAUCRACY

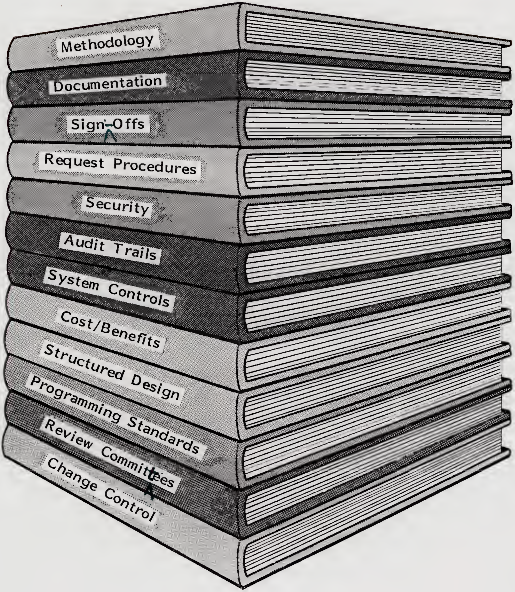
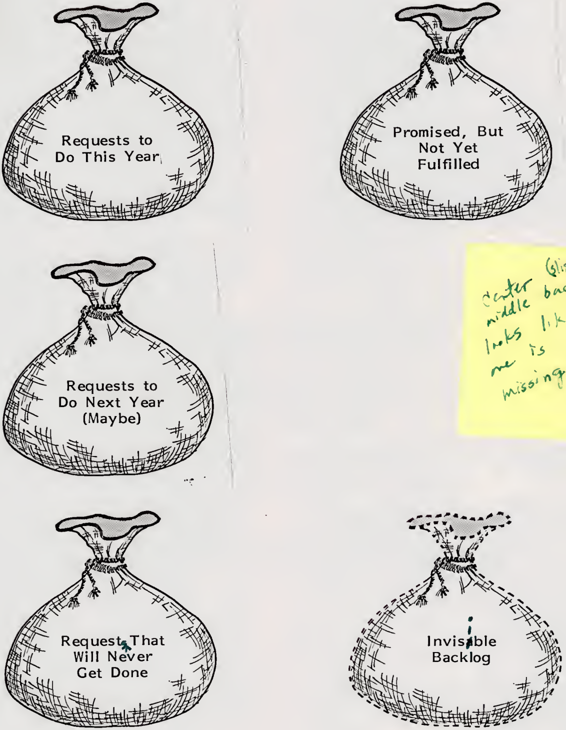

Methodology
Documentation
Sign-Offs
Request Procedures
Security
Audit Trails
System Controls
Cost/Benefits
Structured Design
Programming Standards
Review Committees
Change Control

EXHIBIT IV-3

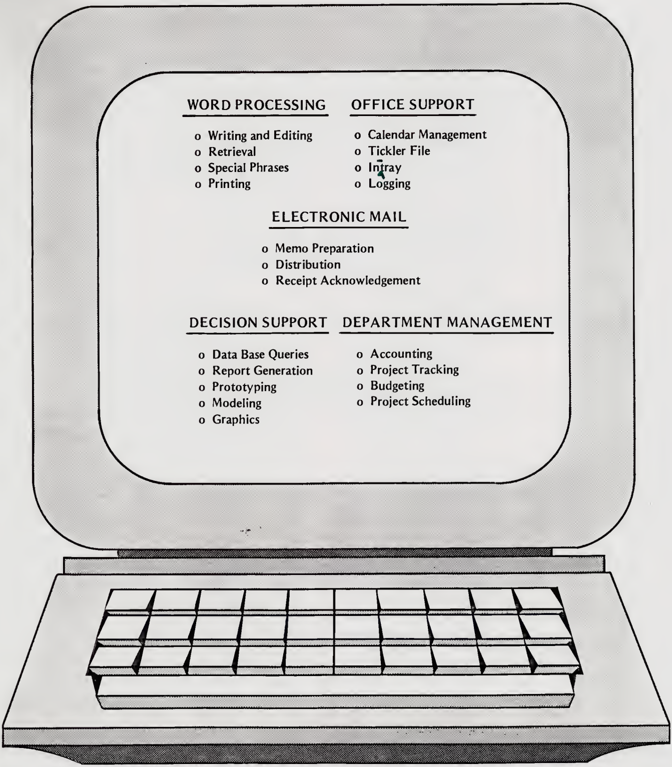
USERS' NEGATIVE PERCEPTION OF I.S.


Requests to Do This Year
Promised, But Not Yet Fulfilled
Requests to Do Next Year (Maybe)
Requests That Will Never Get Done
Invisable Backlog

center (slightly) middle bag — looks like one is missing

EXHIBIT V-1

UNDERSTANDING USERS' TOTAL NEEDS



WORD PROCESSING

- o Writing and Editing
- o Retrieval
- o Special Phrases
- o Printing

OFFICE SUPPORT

- o Calendar Management
- o Tickler File
- o Intray
- o Logging

ELECTRONIC MAIL

- o Memo Preparation
- o Distribution
- o Receipt Acknowledgement

DECISION SUPPORT

- o Data Base Queries
- o Report Generation
- o Prototyping
- o Modeling
- o Graphics

DEPARTMENT MANAGEMENT

- o Accounting
- o Project Tracking
- o Budgeting
- o Project Scheduling

EXHIBIT V-2

ORGANIZATIONAL DYNAMISM

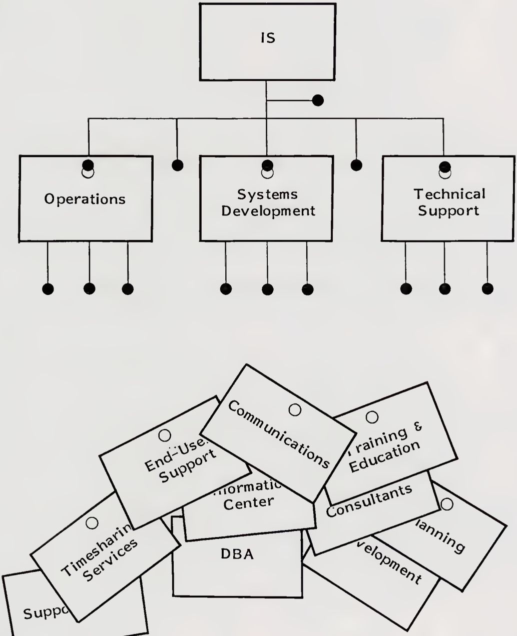

IS
Operations
Systems Development
Technical Support
Communications
raining & Education
End-Use Support
ormatic Center
Consultants
lanning
velopment
DBA
Timesharin Services
Supp

EXHIBIT V-3

PUTTING I.S. BACK IN THE LOOP

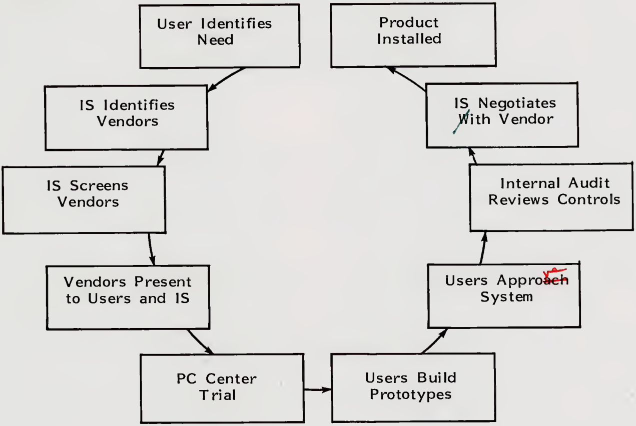

User Identifies Need
IS Identifies Vendors
IS Screens Vendors
Vendors Present to Users and IS
PC Center Trial
Users Build Prototypes
Users Appro~~ach~~ve System
Internal Audit Reviews Controls
IS Negotiates With Vendor
Product Installed

EXHIBIT V-4

MARKETING PRODUCTS AND SERVICES TO END-USERS

- Demonstrations
  - Capabilities of Existing Products
  - Evaluations of Proposed Products
- Tours
  - Information Center
  - Microcomputer Center
- Familiaization Courses
  - Introduction to Available Services
  - Introduction to IS-Supported Software
- Newsletters
  - Interviews with End-Users
  - Communications (New Products, Guidelines, etc.)
- Marketing Representatives
  - Oversee Computing Activity for Assigned Clients
  - IS Contact Point for End-Users

EXHIBIT VI-1

RETURN OF THE APPLICATION ISLANDS

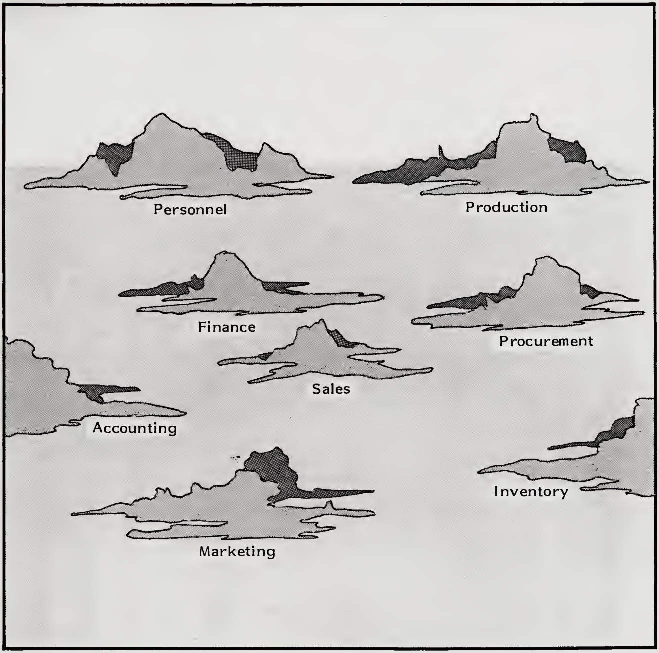

Personnel
Production
Finance
Procurement
Sales
Accounting
Inventory
Marketing

EXHIBIT VI-2

MICROCOMPUTER COMPATIBILITY STANDARDS (HARDWARE CONFIGURATIONS. AND SOFTWARE)

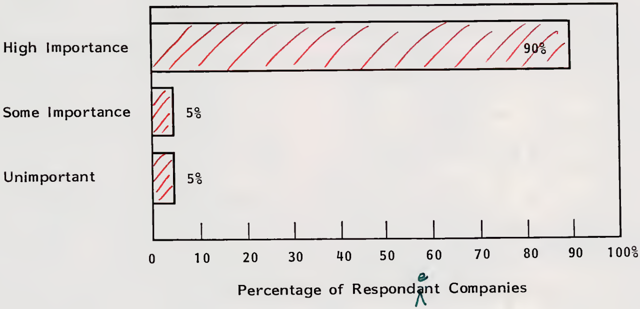


EXHIBIT VI-3

DUPLICATIONS AND REDUNDANCIES:

"WILL THE REAL DEPARTMENT 'A' TRANSACTIONS~~,~~ PLEASE STAND UP?"

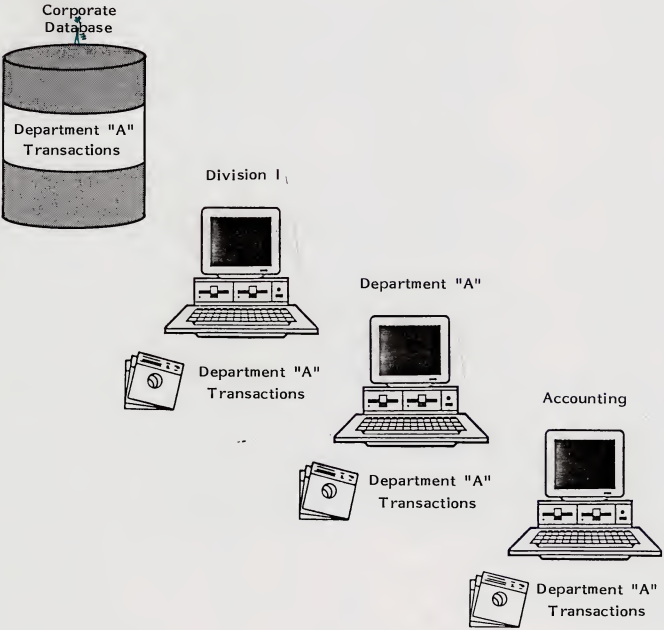

Corporate Database
Department "A" Transactions
Division I
Department "A" Transactions
Department "A"
Department "A" Transactions
Accounting
Department "A" Transactions

EXHIBIT VI-4

UNDERMINING THE I.S. AUTHORITY

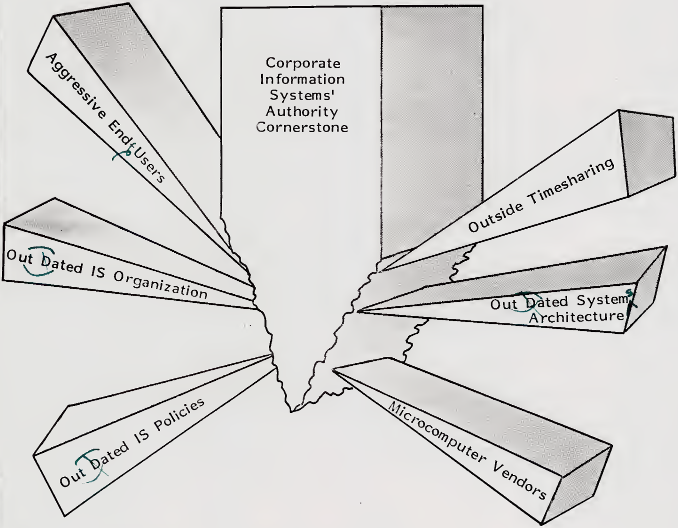

Corporate Information Systems' Authority Cornerstone
Aggressive End Users
Out Dated IS Organization
Out Dated IS Policies
Outside Timesharing
Out Dated Systems Architecture
Microcomputer Vendors

EXHIBIT VII-1

COMPANY "A"

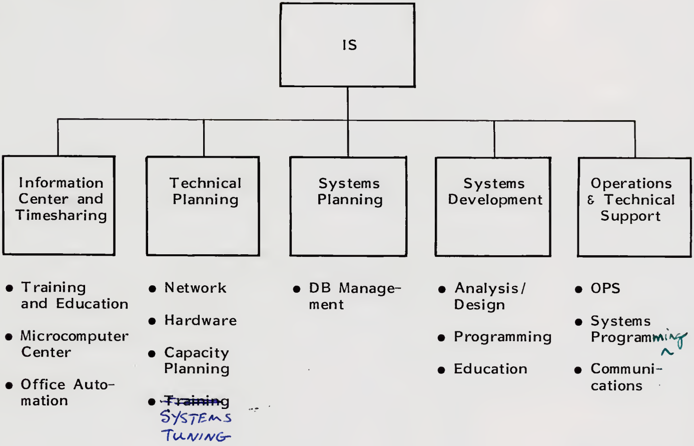

IS
Information Center and Timesharing
Technical Planning
Systems Planning
Systems Development
Operations & Technical Support
• Training and Education
• Microcomputer Center
• Office Automation
• Network
• Hardware
• Capacity Planning
• ~~Training~~ SYSTEMS TUNING
• DB Management
• Analysis/Design
• Programming
• Education
• OPS
• Systems Programming
• Communications

EXHIBIT VII-~~3~~ 2

COMPANY "B"

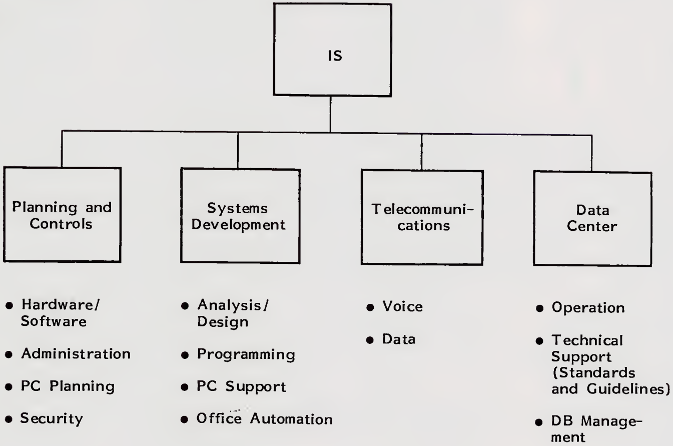

IS
Planning and Controls
Systems Development
Telecommunications
Data Center
• Hardware/ Software
• Administration
• PC Planning
• Security
• Analysis/ Design
• Programming
• PC Support
• Office Automation
• Voice
• Data
• Operation
• Technical Support (Standards and Guidelines)
• DB Management

EXHIBIT VII-3

COMPANY "C"

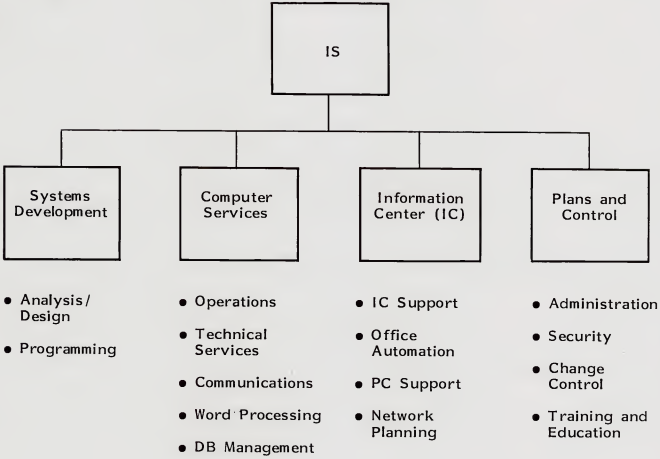

IS
Systems Development
Computer Services
Information Center (IC)
Plans and Control
• Analysis/ Design
• Programming
• Operations
• Technical Services
• Communications
• Word Processing
• DB Management
• IC Support
• Office Automation
• PC Support
• Network Planning
• Administration
• Security
• Change Control
• Training and Education

EXHIBIT VII-4

COMPANY "D"

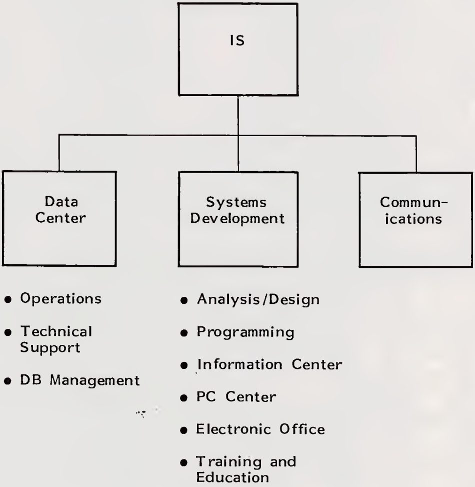
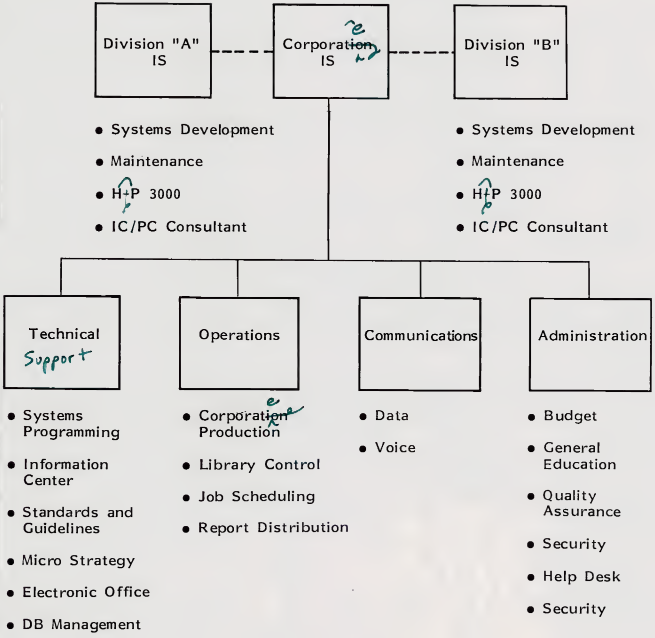

IS
Data Center
Systems Development
Commun-ications
Operations
Technical Support
DB Management
Analysis/Design
Programming
Information Center
PC Center
Electronic Office
Training and Education

EXHIBIT VII-5

COMPANY "E"



Division "A" IS
Corporat~~ion~~e IS
Division "B" IS
Technical Support
Operations
Communications
Administration

Division "A" IS

- Systems Development
- Maintenance
- H+P 3000
- IC/PC Consultant

Division "B" IS

- Systems Development
- Maintenance
- H+P 3000
- IC/PC Consultant

Technical Support

- Systems Programming
- Information Center
- Standards and Guidelines
- Micro Strategy
- Electronic Office
- DB Management

Operations

- Corporat~~ion~~e Production
- Library Control
- Job Scheduling
- Report Distribution

Communications

- Data
- Voice

Administration

- Budget
- General Education
- Quality Assurance
- Security
- Help Desk
- Security

EXHIBIT VII-6

COMPANY "F"

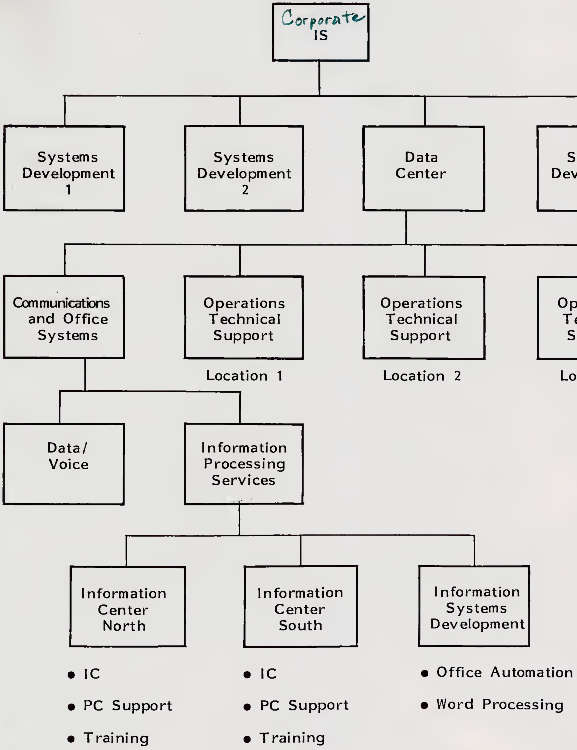

Corporate IS
Systems Development 1
Systems Development 2
Data Center
Systems Development 3
Communications and Office Systems
Operations Technical Support
Location 1
Operations Technical Support
Location 2
Operations Technical Support
Location 3
Data/ Voice
Information Processing Services
Information Center North
• IC
• PC Support
• Training
Information Center South
• IC
• PC Support
• Training
Information Systems Development
• Office Automation
• Word Processing

EXHIBIT VII-7

FUTURE DISTRIBUTED SYSTEMS

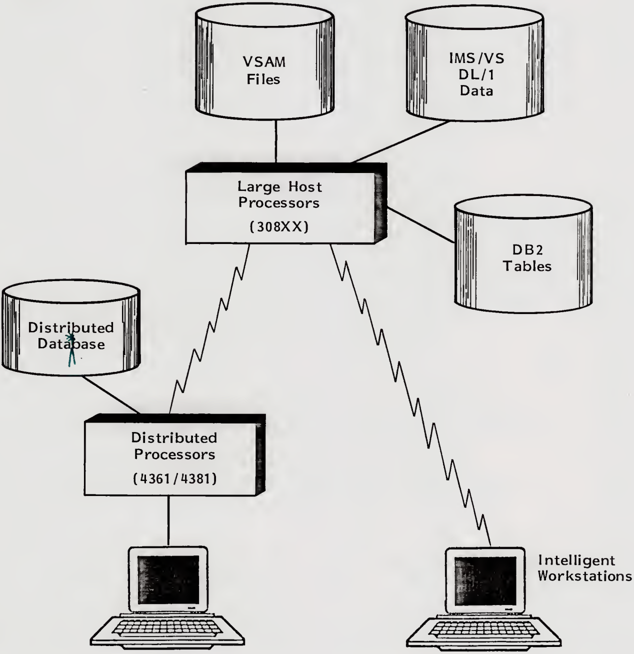

VSAM Files
IMS/VS DL/1 Data
Large Host Processors (308XX)
DB2 Tables
Distributed Database
Distributed Processors (4361/4381)
Intelligent Workstations

EXHIBIT VII-8

TOPICS FOR END-USER EDUCATION

- System Controls
  - Input, Processing, Output
  - File Verification
  - File Access
  - Auditing
  - File and Program Backup
- Environmental Controls
  - Systems Documentation
  - Library Procedures
  - Temperature and Air Filtration
  - Clean Power
  - Electrical Noise
- Security
  - Physical Security
  - User Identification Numbers
  - Passwords (Security Software)
  - Database Access Authorization
  - Security Violation Procedures

EXHIBIT VII-9

THE END-USER COMPUTING MANUAL TABLE OF CONTENTS

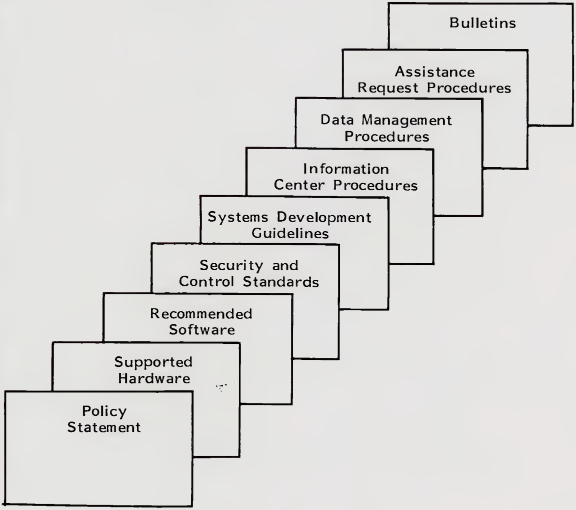
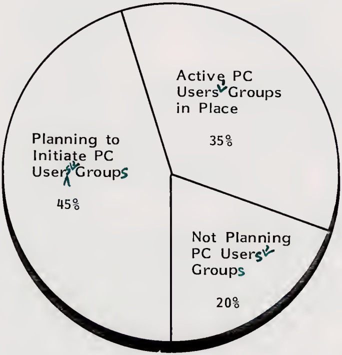

Bulletins
Assistance Request Procedures
Data Management Procedures
Information Center Procedures
Systems Development Guidelines
Security and Control Standards
Recommended Software
Supported Hardware
Policy Statement

EXHIBIT VI-10

PC USERS GROUPS STATISTICS

(Percentage of Companies Supporting End-User Computing)



100 ✓

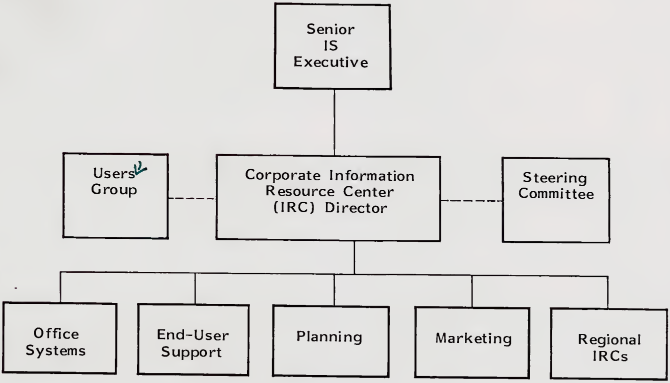
EXHIBIT VIII-1

I.S. ACTION TO FACILITATE END-USER COMPUTING

- Establish a Technical Planning Staff Function
- Establish an Information Resource Center for End-Users
- Initiate an End-User Computing Users' Group
- Establish an End-User Steering Committee
- Establish Consultant-Client Relationships
- Develop Strategic Organizational Plans

EXHIBIT VIII-2

THE CORPORATE INFORMATION RESOURCE CENTER


Senior IS Executive
Users Group
Corporate Information Resource Center (IRC) Director
Steering Committee
Office Systems
End-User Support
Planning
Marketing
Regional IRCs

Office Systems

- Word Processing
- Correspondence
- Electronic Mail
- Management Support

End-User Support

- Consulting
- Training
- Technical Assistance (Queries, Modeling, Reports, Graphs, Prototyping, and General Management)

Planning

- Standards/Guidelines
- Micro Strategies
- IRC Coordination
- Systems Develoment Liaison
- Local Area Network Planning
- Micro-Mainframe Links
- End-User Computing Manual Maintenance and Distribution

Marketing

- Announcements
- Tours
- Demonstrations
- General Education ~~Indoctrination~~
- Vendor Viability Analysis
- Pilot Coordination

Regional IRCs

- Information Centers
- Micro Equipment Centers
- End-User Support

Also need a
copy of the
Questionnaire

Thanks

CONFIDENTIAL

INPUT QUESTIONNAIRE

CATALOG. NO U C O R
SIC. CODE
SIZE CODE
AREA CODE
STUDY CODE
DATE
MM DD YY

STUDY TITLE:
TYPE OF INTERVIEW: ☐ VENDOR ☐ USER ☐ TELEPHONE ☐ ON-SITE ☐ MAIL

INTERVIEWER:

COMPANY:

CO. TYPE:

ADDRESS:

SALES:

EMPL:

CITY:

STATE:

ZIP:

INDUSTRY ☐

☐ DISCRETE MANUFACTURING
☐ PROCESS MANUFACTURING
☐ TRANSPORTATION
☐ MEDICAL
☐ SERVICES
☐ UTILITIES
☐ RETAIL
☐ BANKING
☐ WHOLESALE
☐ OTHER
☐ INSURANCE
☐ GOVERNMENT- FEDERAL
☐ GOVERNMENT-STATE & LOCAL
☐ EDUCATION

INTERVIEWS

NAME	TITLE	TELEPHONE NO:

SUMMARY

REFERENCES

CATALOG NO. UCOR☐☐☐

UCOR QUESTIONNAIRE

1. What is the level of end-user computing at your organization? (check applicable boxes)

   ☐ Standalone PC's with spreadsheet, wordprocessing, and possibly some downloading of corporate data.

   ☐ The information center.

   ☐ A microcomputer center.

   ☐ PC-to-mainframe links with access to corporate databases.

   ☐ PC-to-PC communications.

   ☐ DDP utilizing PC's and/or minis.

   ☐ Electronic office (IBM's PROFS, DEC's all-in-1, DE's CEO)

   ☐ Internal timesharing services.

   ☐ Other ______________________________

2. Do you believe a policy statement from executive management should be issued on the subject of the authorization for end-user computing?

   ☐ Strongly disagree

   ☐ Disagree

   ☐ Not sure

   ☐ Agree

   ☐ Strongly agree

   ☐ Comments ______________________________

3. If you agree that a policy statement is important which of the following situations would require the approval of corporate IS or a Sterring Committee?

   Rating (1 = low importance, 5 = high importance)

   ☐ Transaction driven systems.

   ☐ Multiple users (either one at a time or concurrent)

   ☐ Communications (either outside or other inside CPU's)

   ☐ Integration with other corporate systems.

   ☐ Special programming required.

   ☐ System dependent on key personnel or unique equipment.

   ☐ System requires access to corporate data.

   ☐ Vendor evaluation and selection.

CATALOG NO. U C O R ☐ ☐ ☐

4. Do you agree that end users should be prohibited from using programming languages such as PASCAL, BASIC or C?

☐ Strongly disagree

☐ Disagree

☐ Not sure

☐ Agree

☐ Strongly agree

☐ Explain ____

____

____

5. What level of management do you believe should be in an End-User computing steering committee?

☐ CEO

☐ Operating Division Executives

☐ Line Management

☐ IS Management

☐ Other ____________________

6. What should be included in the charter of the End-User computing steering committee?

☐ Policy setting

☐ Hardware/Software approvals

☐ Violation Reviews

☐ Arbitration

☐ Security Approvals

☐ Systems Cost/Benefit Reviews

☐ Other ____________________

7. Do you believe a company-wide PC users group is an effective vehicle to reduce duplicate effort, reduce incompatibilities, enforce standards, and share knowledge about software packages?

☐ Firmly believe

☐ Believe

☐ Don't know

☐ Don't believe

☐ Firmly don't believe

Explain ______________________________

____

____

8. If you believe that a PC users group is beneficial how do you think it should function? (1 = low importance, 5 = high importance)

Rating (1 = low importance, 5 = high importance)

_____ Officers should be voted in each year.

_____ Special interest groups should be formed.

_____ A newsletter should be published.

_____ Whitepapers should be distributed to IS management and steering committee members.

_____ Formal recommendations should be presented to the End Users computing steering committee.

_____ IS should respond to formal recommendations.

_____ Other ______________________________

Comments ______________________________

____

____

____

____

9. What do you believe the major pitfalls might be of a PC users group?

10. There is much written about the importance of Computer Literary training, but not much has been said about systems development education for end-users. Do you believe the end-users should receive education on such topics as system controls, security, documentation, auditing, communications, capacity planning, etc.

☐ Definately not important

☐ Unimportant

☐ Don't know

☐ Important

☐ Extremely important

Comments

11. How important do you believe the following security measures are relative to end-user computer? (1 = low importance, 5 = high importance)

	Rating	Comments
Individual End-User should be issued security ID members.	______	__________
A formal request form should be used to gain access to computer data.	______	__________
Passwords should be used to gain access to computer data.	______	__________
Computer data should be the responsibility of the primary using department, who should have access approval authority.	______	__________
Security violations should be reviewed by the security department, IS Steering Committee, and/or the owning department.	______	__________
IS should maintain inventory control on all proprietary software packages and PC equipment.	______	__________

12. How important do you believe compatibility standards are on the following end-user computing topics? (1 = low importance 5 = high importance).

Rating	Topic
_____	Limited number of microcomputer vendors and configurations.
_____	Common operating systems, utilities, graphics, wordprocessing and spreadsheet packages.
_____	Compatible diskettes, cassettes, and tape.
_____	Single communications standards, protocols, LANs, and interfaces.
_____	Common application program.

Comments ______________________________

____

13. What do you believe the impact of end-user computing will be on future development of corporate integrated systems?

☐ No impact

☐ Minor impact

☐ Don't know

☐ Significant

☐ Nearly every system will be affected.

Comments ______________________________

____

____

____

14. Can you see a trend towards integrating micros and minis into corporate systems where the micros process transactions and services local needs?

☐ Not feasible

☐ Special situations only

☐ Don't know

☐ Highly probable

☐ The wave of the future

Comments ____

____

15. Three years from now how do you envision your firm being organized to support End-User computing? _________________________

____

____

____

16. Does your organization have a limited dollar amount an end user can expand for hardware and/or software before requiring special approval? Amount ________.

Comments ____

____

____

____

____

17. How do the following end user computing functions fit into your organization? (to what position do they report? Are they centralized or decentralized? Does IS have authority?)

The information center

End-User computer literary training

Standalone PC Support

Electronic office

Microcomputer Center

PC/Mini/Mainframe Integration (DDP)

PC-to-mainframe planning

Lan planning

End-User systems planning/development

Internal timesharing services

18. If the end-users are given the discretion to develop their own operational systems do you believe this will cause long term problems in the areas of integration and maintenance?

☐ Serious problems ☐ Solvable problems ☐ No problems

Reasons